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Final Report of the Evaluation of the Medicare Catastrophic Care Act: Impacts on Maternal and Child Health Programs and Beneficiaries

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15. Supplementary Notes The Medicare Catastrophic Coverage Act (MCCA) of 1988 mandated the expansion of Medicaid coverage to pregnant women and children less than two years of age living in households with income at, or below, 100 % of the Federal Poverty Level, breaking the previous link of Medicaid to welfare, i.e., AFDC and SSI. Many Congressmen anticipated reduction of U. S. infant mortality and childhood morbidity.

16. Abstract (Limit: 200 words)

The evaluation assessed several types of effects and used several state and national level databases to try to overcome the difficulties in assessing national policy changes that do not provide for controlled implementation. The measurement of the anticipated outcome of the expansion, reduced infant mortality, is difficult, due to the rare nature of infant mortality, and the complexity of the associated factors, known and unknown. The study assessed changes in Medicaid enrollment among low-income women, use of prenatal care, measured by use of any prenatal care, the timeliness of initiating care, the adequacy of prenatal care, and the frequency of adverse birth outcomes (low birthweight and preterm deliveries), rates of fetal, neonatal and infant mortality. Potential barriers to prenatal care access were also explored. The expansions were accompanied by large percentage increases in the number of deliveries financed by Medicaid, about 44% increase from 1987 through 1989, a 29% increase in Medicaid's share of all live births (12 state analysis). As a result of the expansions, Medicaid enrolled women increased their use of prenatal care services relative to eligible, non-enrolled women, even though evidence for similar improvements among all low-income women was inconclusive. Of all low-income pregnant women, using national vital statistics data, found that, on average, the expansions were accompanied by reduced delay in starting prenatal care for teenaged and unmarried mothers. Also, in Missouri, during the first full year of the expansion, the average teenaged mother enrolled in Medicaid used more and more timely prenatal care than prior to the expansions for poor pregnant women. In contrast, low-income , non-enrolled pregnant women in Missouri generally had the same utilization patterns as before the expansion, even with increased rates of "inadequate" care among teen and adult women. In both timeliness and adequacy of prenatal care, the average Medicaid-enrolled black mother improved relative to non-enrolled, but eligible black mothers. Analyses show a clear relationship between timeliness of prenatal care & birth outcomes, i.e., a reduction of 20-33 grams for white mothers and 22-56 grams for black mothers for each month's delay in initiation of prenatal care. A case-control analysis of mortality in Missouri supports the finding. National vital statistics show that increases of 10% in the size of the Medicaid eligible population is associated with reductions of preterm birth rates and low birthweight rates of 2% to 5%.

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EXECUTIVE SUMMARY

In 1988, as part of the Medicare Catastrophic Coverage Act (MCCA), Congress mandated expansion of Medicaid coverage to all pregnant women and children less than two years of age living in households at or below 100% of the Federal Poverty Level (FPL). The objectives of this and other similar expansion mandates enacted during the 1980s were to reduce infant mortality and childhood morbidity in the U.S. by making publicly financed prenatal and pediatric health care available to more low income mothers and children. Abt Associates, under contract to the Health Care Financing Administration (HCFA), evaluated the MCCA and other expansions that were implemented before 1990.

This evaluation applied quantitative and qualitative analytic techniques to several state and national data sources. The project data base included both cross-sectional and longitudinal files, with considerable variation in the amount of information available about each observation. The evaluators chose this comprehensive approach in order to address several problems inherent in their task: 1) no "controlled" test of expansion effects was possible, 2) the events in question, particularly mortality rates, are extremely rare, 3) bias due to self-selection in use of health care services makes detection of policy effects difficult, 4) most of the important data bases lack measures of income that could be used to identify the target population of Medicaid-eligible women, and 5) many of the available health care utilization measures (for example, the volume of prenatal care) are not sensitive to differences in the content of care.

The MCCA evaluation assessed possible effects of the expansions in three areas: 1) Medicaid enrollment among low-income women, 2) use of prenatal care, measured by use of any prenatal care, the timeliness of initiating care, and the adequacy of care, and 3) the frequency of adverse birth outcomes, measured by the rates of low birthweight and preterm deliveries, as well as rates of fetal, neonatal, and infant mortality. Potential barriers to prenatal care access were also explored.

Enrollment

The Medicaid expansions were accompanied by large percentage increases in the number of deliveries financed by Medicaid. Data from 12 states in the Medicaid Statistical Information System and from Missouri from 1987 through 1989 show average increases of 44% in covered deliveries and 29% in Medicaid's share of all live births. Increases in 5 states that implemented expansions during this period ranged from 23% (Washington) to over 75% (Missouri). In Missouri, the increases were relatively larger for women in demographic groups under represented in the Medicaid program prior to the expansions (e.g., white, teenaged, high-school educated, and married women).

Utilization of Prenatal Care

As a result of the Missouri and other state expansions, Medicaid-enrolled women increased their use of prenatal care services relative to eligible but non-enrolled women, even though evidence for similar improvements among all low-income women was inconclusive.

Of all low-income pregnant women, some demographic groups appear to have gained more through the expansions than others. An analysis of expansions throughout the 1980s, using national vital statistics data, found that, on average, the expansions were accompanied by reduced delay in starting prenatal care, for teenaged and unmarried mothers.

In the first full year of Missouri's 1988 Medicaid expansion, the average teenaged mother enrolled in Medicaid used more and more timely prenatal care after the expansion than before. In contrast, low-income teenaged Missouri women generally maintained pre-expansion utilization patterns, although the rate of "inadequate" care for teenagers increased by 1.3 percentage points and the rate among adult mothers increased by 2.4 percentage points.

In both timeliness and adequacy of prenatal care, the average Medicaid-enrolled black mother improved relative to non-enrolled but eligible black mothers. However, low-income black mothers lost ground relative to white mothers in the 1988 Missouri expansion.

If the content of care were to vary with the volume of care and risk characteristics of the mother, crude measures of adequacy and timeliness could mask important influences on birth outcomes. However, measures describing the content of prenatal care based on data from the National Maternal and Infant Health Survey (NMIHS) suggest that the service content of prenatal care would be unlikely to change dramatically as overall utilization levels change.

Birth Outcomes

The MCCA evaluation explored both the relationships between use of prenatal care and birth outcomes, and trends in birth outcomes from before to after expansions of Medicaid coverage.

Analyses based on NMIHS data show a clear relationship between timeliness of prenatal care and birth outcomes, specifically a reduction of 20-33 grams in birthweight for white mothers and 22-56 grams for black mothers for each month's delay in initiation of care. A case-control analysis of mortality and birthweight data in Missouri supports this finding, concluding that adequate prenatal care, or the use of any prenatal care at all, is associated with reduced risks of low birthweight and infant mortality.

National vital statistics analyses suggest positive expansion effects on birth outcomes. Over the period from 1983 through 1990, increases of 10% in the size of the Medicaid-eligible population of low-income mothers were associated with reductions in rates of preterm birth and low birthweight ranging from 2% to 5%.

Access Barriers

Observed changes in utilization and outcomes may reflect a combination of influences, including changed medical and behavioral risk profiles of mothers and changes in the availability of health care services. The MCCA evaluation clearly demonstrated that the expansions were associated with substantial changes in demographic profiles of mothers enrolled in Medicaid. Some evidence from Missouri also suggests that, at least during this state's first expansion, these women may have also faced increased access barriers.

Using Medicaid claims and provider data for the three-year period that included Missouri's 1988 expansion, the evaluators showed that, while the number of providers of prenatal and delivery services to Medicaid-enrolled women increased by 12%, the number of Medicaid women served by these providers increased by 90%, implying an increase in Medicaid caseload of 73%.

In addition, Missouri secured the funds needed to expand Medicaid coverage by reducing expenditures for other programs, among the most important of which were the public prenatal care clinics, financed by state and Federal (Title V) expenditures. At the same time that Missouri implemented its 1988 expansion, the supply of public health clinic services available to serve low-income pregnant women and children in Missouri was contracting. By the fall of 1988, 67 of the state's 114 prenatal care clinics had closed or were threatening to close.

Conclusion

In general, the findings from the MCCA evaluation confirm findings reported from other researchers, that the Medicaid expansions addressed an important part—but only a part—of the access difficulties faced by indigent pregnant women.

- The Medicaid expansions dramatically increased the enrollment of poor and near-poor women in Medicaid.
- Findings on the effects of the expansions on prenatal care utilization were mixed, with analysis of national vital statistics data suggesting positive effects on timeliness and the analysis of Missouri data finding no substantial improvement in timeliness or adequacy after the state's 1988 expansion.
- In most analyses, the evaluation demonstrated a significant relationship between use of prenatal care and the reduction of adverse birth outcomes.
- There is a small, but significant positive association between the expansion of Medicaid eligibility and improvement in results for prenatal delay/birth outcomes.
- State-level decisions on how to implement Medicaid expansions probably had a substantial influence on the effects of increasing coverage for indigent populations.

INTRODUCTION

Over 25% of pregnant women in the United States receive late or inadequate prenatal care (Institute of Medicine, 1988). That has long been true. However, by the mid-1980s, there were signs that the utilization of prenatal care was declining in critical ways, as favorable trends in utilization through the previous decade began to abate or reverse.[1] Most worrisome, these declines disproportionately affected young, poor, uneducated, unmarried, and minority mothers — precisely the mothers who, judging by their rates of adverse birth outcomes, were most in need of care.

In fact, the implications of these declines were not entirely clear, given uncertainties about the effect of prenatal care on birth outcomes and maternal health (e.g., Harris, 1982; Rosenzweig and Schultz, 1983; Institute of Medicine, 1985). But there was a general recognition that a troubling situation was getting somewhat worse, particularly for the most disadvantaged women and for minority women. Moreover, even if there were uncertainties surrounding the effects of prenatal care, rates of infant mortality in the U.S. gave cause to take the declines seriously. By the late 1980s — after rates of prenatal care utilization had declined among key population groups — historical downward trends in infant mortality slowed among whites and virtually halted among nonwhites.[2]

One reason key groups did not receive adequate prenatal care — to be sure, one of many reasons (Institute of Medicine, 1985) — was the existence of financial barriers that hampered the access of pregnant women to prenatal care. While Medicaid was the largest single source of health coverage for the poor, the program failed to cover many people below the federal poverty level. By the mid-1980s, the proportion of the poor who were covered by Medicaid declined substantially — to 38% of the poor in 1984, down from 65% in 1976 (Rosenbaum, Hughes, and Johnson, 1988). This decline in the proportion of the poor who were covered was mirrored by a decline in the effective state eligibility ceilings: from 73% of the federal poverty level in 1975 for a family of three (Hill, 1988), to 56% of the poverty level in 1986 (Alan Guttmacher Institute, 1987). Poor pregnant women who were not covered were commonly uninsured for health care (Torres and Kenney, 1989).

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[1] The proportion of women receiving care in the first trimester improved steadily between 1969 and 1980. From 1980 to 1985, however, this percentage remained stable or decreased, while the percentage of births to women with late or no prenatal care increased (Institute of Medicine, 1988). See also Alan Guttmacher Institute (1987).

[2] In 1989, the infant mortality rate among nonwhites actually increased very slightly (National Center for Health Statistics, 1993). While the increase was quite small and the rate resumed its decline in 1990, it was the first year-to-year increase in infant mortality for blacks or whites in over 15 years.

Partially in response, Congress passed a series of laws that encouraged and later required states to expand Medicaid coverage for poor and near poor pregnant women. These laws resulted in the so-called "Medicaid expansions," which effectively broke the link between Medicaid and eligibility for cash welfare payments for this segment of the population. In addition, these laws encouraged or required states to streamline the eligibility hurdles that were thought to deter eligible women from enrolling in Medicaid.[3]

By 1990, all states had met the mandates of these statutes, providing coverage to pregnant women at 133% of the Federal Poverty Level (FPL). In addition, most states had taken steps to streamline their eligibility processes to encourage enrollment for pregnant women. Twenty-three of the states went further than the mandate, raising eligibility to the optional maximum level of 185% of FPL and providing substantial simplifications to their eligibility processes as well (National Governors' Association, 1991a and 1991b).

Thus, by 1990, the Medicaid program for pregnant women and infants had changed substantially, as both the formal standards of eligibility and the processes by which women enrolled in the program had been liberalized. This was one of the major initiatives in social policy in the 1980s, and it came at great cost.[4] The question to ask is whether it achieved the results policy makers intended.

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[3] The most important changes to streamline eligibility processes for pregnant women were to drop the asset tests otherwise applicable to Medicaid eligibility; to establish presumptive eligibility, so that authorized providers could grant immediate eligibility for coverage of prenatal services, pending more definitive eligibility determinations; and to establish continuous eligibility, so that (within limits) income variations in the course of pregnancy would not affect eligibility. Some states took the opportunity as well to institute special outreach programs (e.g., stationing eligibility workers in hospitals and clinics, or advertising the availability of coverage more aggressively); to simplify their application forms; and to update their obstetrics fees to more competitive levels, to encourage wider provider participation in the program. For a review of state activities in the years of Medicaid expansions, see Hill (1992).

[4] For example, Coulam (1995) reports that the total Federal and state Medicaid expenditures on women made eligible by Missouri's first expansion in 1988 "were double original estimates," at $31.8 million, compared to an initial prediction of $15.5 million. By 1992, Missouri had paid over $100 million to cover expansion pregnant women.

Abt Associates is under contract to the Health Care Financing Administration (HCFA) to evaluate the effects of the Medicare Catastrophic Coverage Act (MCCA) on Medicare and Medicaid enrollees. While the MCCA's Medicare provisions were repealed by Congress, MCCA's Medicaid provisions remained — notably, provisions increasing the mandatory eligibility threshold for pregnant women. Our MCCA evaluation has focused on those expansions. For reasons set forth in Section 1 below concerning how and when the expansions were implemented, Abt has focused on the longer stream of expansion activity through 1990, rather than restricting our attention to the changes of MCCA alone.

Our evaluation work has involved many different kinds of analytic work — some at the state level, some using national databases — to appraise effects of the national movement to expand Medicaid eligibility for pregnant women. The report that follows is the final report of our evaluation, which summarizes the findings of all this work and the import of these findings for the appraisal of the Medicaid expansion movement of the 1980s. The report is organized as follows:

- Section 1 is a background section on Medicaid policy, summarizing changes in program eligibility and processes in the 1980s.
- Section 2 provides an overview of the methodological problems that our evaluation design must resolve.
- Section 3 summarizes our evaluation design — in particular, the multi-faceted approach that constitutes the best response to the methodological problems raised in the previous section.
- Section 4 reviews evidence on the enrollment effects of the expansions — i.e., the increases in enrollment associated with formal changes in eligibility ceilings.
- Section 5 provides a detailed discussion of the utilization effects of the expansions, examining questions of how the timing and frequency of care were affected by the expansions.
- Section 6 reports our studies of the relationship between prenatal care and birth outcomes.
- Section 7 reports on one study of the relationship between the expansion of Medicaid eligibility and birth outcomes.

- Section 8 reviews how the expansions were implemented in one state (Missouri), to explore the challenge of implementing the expansions in a complex system and to examine questions about the supply side of health care that the expansions generally did not address.
- Section 9 summarizes the findings of other researchers on the effects of the Medicaid expansions.
- Section 10 of the report then offers a summary and conclusion on the implications of our evaluation.

The basic message of these studies is not simple, but it is important. Any evaluation of the Medicaid expansions faces severe methodological problems and key weaknesses in the available data. Notwithstanding these problems, Abt Associates' MCCA Evaluation finds some statistically significant improvements in utilization and birth outcomes associated with the expansions. While those improvements are not apparent everywhere and under all conditions, they are sufficiently robust to suggest that the expansions have yielded small, but important improvements in the birth prospects for high-risk populations.

1.0 BACKGROUND: THE MEDICAID EXPANSIONS

Medicaid is a joint federal-state program providing health insurance for the eligible poor. Minimum eligibility criteria are set at the federal level.[5] Traditionally, Medicaid coverage for women and children was tied to participation in cash assistance programs (primarily, Aid to Families With Dependent Children (AFDC)). This link to AFDC had three consequences. First, women in two-parent households and women who were pregnant with their first child were excluded from the Medicaid program.[6] Second, across the states, Medicaid eligibility levels for pregnant women were artifacts of varying state AFDC need and payment standards, without any necessary relationship to the value of more liberal coverage of prenatal and neonatal care. Finally, Medicaid enrollment was obtained by qualifying for AFDC, which meant that pregnant women could obtain access to Medicaid coverage only by successfully traversing complex eligibility procedures governing AFDC.

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[5] This paragraph is drawn in part from Cole (1995).

[6] There was one principal exception. In States with an AFDC-UP (Unemployed Persons) program, pregnant women in two-person households qualified for Medicaid if they qualified for AFDC-UP.

The Medicaid expansions of the 1980s addressed all three of these problems. Exhibit 1.1 shows the legislative changes affecting the eligibility of pregnant women during the 1980s. As seen in Exhibit 1.1, federal changes in the Medicaid program were often enacted first as options that states could participate in, and then as mandated changes. There were three main categories of eligibility expansions during this time period: 1) changes in the household composition requirements; 2) increases in eligibility thresholds (i.e., the maximum incomes allowed for pregnant women to qualify);[7] and 3) liberalizations in eligibility procedure. As shown in Exhibit 1.2, the majority of states exceeded the procedural and financial minimums that the federal government required. In that sense, most states did not fund minimal expansions mandated by federal legislation, but rather exceeded the minimums by choice.[8]

Within the stream of expansion activity, Abt was tasked to evaluate the Medicare Catastrophic Coverage Act (MCCA) of 1988, as noted in the Introduction. However, only seven states were affected by the first deadline of MCCA in July 1989, since most states already had

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[7] The eligible population also varied over time as state AFDC standards changed. However, as suggested earlier in the text, this change was negative for most states -- largely because the AFDC standard remained constant in nominal terms, but declined in real terms.

[8] The fact that most states *ultimately* adopted eligibility standards at the higher optional levels does not settle the question of whether the expansions offered the right mix of mandates and options. For example, one state that ultimately adopted the highest optional authority -- Missouri -- was nonetheless concerned in earlier years about the fiscal implications of the mandates. Indeed, in a budget overview for state fiscal year 1992 (Missouri Division of Medical Services, undated), Missouri describes federal mandates (explicitly including the Medicaid mandates) as the "Pac Man" of state budgets, consuming state fiscal latitude. The state estimated that enhancements and mandatory expansions of the Medicaid program accounted for almost 60% of all new spending by the state . In addition, it is worth noting that the fiscal stress of the early years of the expansions pressured Missouri into funding the expansion by making cuts elsewhere in the system (see Section 8.2 above). These cuts likely had a negative impact on the availability of prenatal care for indigent women. Notwithstanding this fiscal pressure, however, Missouri moved well beyond the federal mandates in January 1994, joining a majority of other states in raising its eligibility standard to the optional maximum level of 185%.

EXHIBIT 1.1 Abt Associates Evaluation of the Medicare Catastrophic Coverage Act (MCCA):

CHANGES IN FEDERAL REQUIREMENTS GOVERNING MEDICAID ELIGIBILITY FOR PREGNANT WOMEN, 1981 - 1991

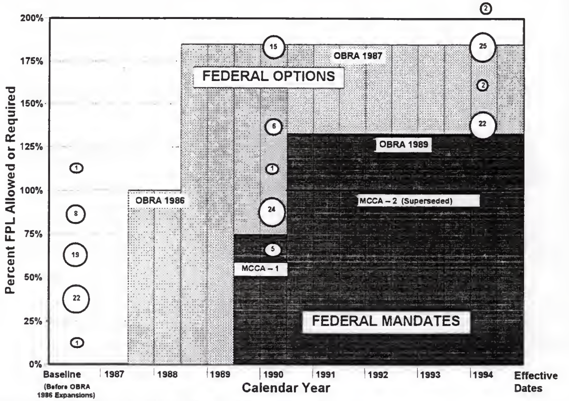
LEGISLATION	EFFECTIVE DATE	RULE
pre-1981		Medicaid eligibility is tied to AFDC eligibility (i.e. eligibility depends on *both* income and family structure).
OBRA 1981	Oct. 1981	Option to extend Medicaid coverage to pregnant women who meet the AFDC income requirements *regardless of family composition*, as of the date of medical verification of pregnancy.
		Mandate to extend Medically Needy coverage to pregnant women, if the State offers a Medically Needy program. (The Medically Needy income eligibility threshold is above the AFDC income threshold.)
1984 Deficit Reduction Act (DEFRA)	Oct. 1984	Mandate to cover pregnant women who meet the AFDC income requirements (women in this expansion group include single women with no other children and -- in families with a second parent -- women who would be eligible for AFDC-UP if the State had an AFDC-UP program). This change meant that *eligibility of pregnant women was no longer tied to family composition*, although in two-parent families the second parent had to be unemployed for the mother to be eligible.
COBRA 1985	July 1986	Mandate to cover *all* income-eligible pregnant women, regardless of family structure (in particular, regardless of whether a second parent was unemployed or not).
OBRA 1986	April 1987	Option to extend coverage to pregnant women with income above the AFDC income standard, but not to exceed 100% of the Federal Poverty Level (FPL).
		Option to streamline eligibility processes -- to drop asset tests, to establish continuous eligibility, and to establish presumptive eligibility.
OBRA 1987	July 1988	Option to extend coverage to pregnant women with income up to 185% of poverty level.
Medicare Catastrophic Coverage Act (MCCA)	July 1989	Mandate to cover pregnant women with incomes up to 100% of the poverty level. (Expanded coverage to be phased in: up to 75% FPL by July 1989; and 100% FPL by July 1990.)
OBRA 1989	April 1990	Mandate to cover pregnant women with incomes up to 133% FPL.
		Mandate to document adequacy of physicians' fees to elicit availability of OB/GYNs for Medicaid population comparable to availability for general population.
OBRA 1990	January 1991	Mandate to establish continuous eligibility and to outstation workers in disproportionate share hospitals and Federally-Qualified Health Centers.

SOURCE: Reproduced with slight modification from Cole (1995).

Exhibit 1.2 Abt Associates Evaluation of the Medicare Catastrophic Coverage Act (MCCA):

MEDICAID ELIGIBILITY EXPANSIONS: FEDERAL OPTIONS AND MANDATES VS. STATE ELIGIBILITY LEVELS a)

(as of January and July of Calendar Years 1987 - 1994)



NOTE The numbers in ellipses represent numbers of states See explanation in footnotes b) - f) in the table below

Income Interval	Number of States with Eligibility Levels in this Income Interval c)								
	Baseline	1987	1988	1989	1990	1991	1992	1993	1994
(Percent of FPL)									
Over 200%	0	0	0	0	0	0	0	1	2
176% - 200% d)	0	0	0	8	15	17	22	24	25
151% - 175%	0	0	0	0	0	1	2	1	2
126% - 150% e)	0	0	0	2	6	33	27	25	22
101% - 125%	1	1	1	2	1	0	0	0	0
76% - 100%	8	20	26	32	24	0	0	0	0
51% - 75% f)	19	15	13	5	5	0	0	0	0
26% - 50%	22	14	10	2	0	0	0	0	0
1% - 25%	1	1	1	0	0	0	0	0	0
TOTAL	51	51	51	51	51	51	51	51	51

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a) The effective dates of the options and mandates were April 1987 (OBRA-1986), July 1988 (OBRA 1987), July 1989 (MCCA-1), Aprill 1990 (OBRA 1989), and July 1990 (MCCA-2) In the graph above the space between the options (i.e., the maximum authority) and the mandates (i.e, the minimum required) defines the range of state discretion for receiving federal matching funds

b) The numbers in the ellipses apply to the baseline period (prior to the implementation of OBRA 1986 expansions), January 1990, and January 1994 The numbers equal the count of states whose eligibility levels for pregnant women are within the income intervals indicated on the Y-axis In January 1990, for example, the minimum eligibility levels in 24 states were between 76% and 100% FPL

c) These counts of the number of states in each income interval are taken as of January of each year The District of Columbia is included in the counts

d) All States in this interval are at 185% exactly without exception

e) OBRA 1989 mandated a minimum eligibility level of 133% FPL by April 1990 The following number of states was at that mimumum eligibility level in January of each year thereafter 27(1991), 20 (1992), 18 (1993), 17 (1994) In other words, by the beginning of 1994 1/3 of all states were at the mandated minimum eligibility level, while 2/3 of all states exceeded that minimum level

f) In January 1990, all 5 states in the 50% - 75% interval were at exactly 75%, as required by MCCA-1

SOURCE: Data on state eligibility levels from the National Governors' Association.

expanded eligibility under options offered in OBRA 1986 and OBRA 1987.[9] Meanwhile, the second step in the MCCA mandate (see Exhibits 1.1 and 1.2) was superseded by OBRA 1989. The effects of MCCA's expansion requirements thus were conditioned by earlier state actions and by a larger stream of legislative activity. Accordingly, our evaluation examined the effects of expansion activity generally, rather than focusing on the limited, extensively confounded effects of MCCA alone.

Our evaluation studies generally do not extend beyond 1990,[10] an end point largely determined by the long lead-times for obtaining and preparing key datasets. Two important limitations follow. First, the studies cover relatively few "expansion" years in any state. Longer time series would be required to show more extensively how states and state infrastructures of health finance and provision adapted to the expansion of Medicaid enrollments. With those later adjustments, there would likely be changes in the effects our evaluation has discovered. Second, studies of later periods might also provide more extensive information about the effects of state efforts to streamline application processes and requirements. We do have some information on this score (e.g., see Cole, 1995); but other studies in our evaluation generally cover periods before any steps were taken to streamline eligibility requirements or processes in most states. That means that our evaluation is focused more purely on the effects of the expansions in financial eligibility limits and changes in household composition requirements than on any changes implemented to ease enrollment complexities.

2.0 PROBLEMS OF EVALUATION DESIGN

The Medicaid expansions are predicated on a model of effects that, while simple, in fact assumes some fairly demanding empirical relationships, the estimation of which raises fundamental methodological difficulties. In this section, we review that model, the methodological difficulties it raises, and how Abt's evaluation design has taken those difficulties into account.

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[9] As noted in Cole (1995), Colorado, Idaho, Nevada, New Hampshire, and North Dakota raised eligibility levels to 75% FPL in July 1989 to comply with the MCCA mandate. Also in July 1989, Indiana and Montana raised eligibility levels to 100%, thus bringing these States into compliance beyond the MCCA minimum. All other states had exercised the optional authority in OBRA 1986 or OBRA 1987 to satisfy the MCCA mandate before that mandate took effect.

[10] There is one exception: the case study of the Medicaid expansions in Missouri (Coulam, 1995) extends to 1992.

2.1 THE EXPECTED EFFECTS OF THE EXPANSIONS

To have the intended positive effects, the expansions of Medicaid eligibility were expected to work in something like the following way:

1. Expansions would increase enrollment — Women who otherwise would not receive appropriate care due to financial barriers would enroll in Medicaid under the expansions.
2. Enrollment would increase the timeliness and adequacy of prenatal care utilization — Enrollment in Medicaid would mean a decline in the direct financial costs of care, resulting in an increase in the demand for prenatal care. Increased demand would result in increased prenatal care utilization, and the increased utilization would be timely, i.e., early enough in the pregnancy to affect birth outcomes.
3. Through more timely and adequate prenatal care, the expansions would improve birth outcomes — As a result of the increase in timely and adequate prenatal care, birth outcomes were expected to improve in measurable ways.

This model was certainly plausible. But there were many different reasons that a simple expansion in Medicaid eligibility might not work as intended, and those reasons posed important challenges to any evaluation design for the Medicaid expansions. For example, enrollees might receive care without Medicaid or the expansions, so that the effect of the Medicaid expansions would simply be to shift to Medicaid the financing of care that would have been received in any event. Or enrollment in Medicaid might not increase the demand for care — financial costs other than the direct cost of care (e.g., costs of transportation and loss of work hours) and non-financial costs (e.g., costs of waiting) might be more important than the direct costs of care for this population. Or due to limitations in the availability of care, access might be rationed in unexpected ways, thereby limiting any increases in utilization. Or enrollments might disproportionately occur late in the birth episode (e.g., just before the birth admission, at the behest of hospitals) — too late for Medicaid eligibility to enhance the utilization of prenatal care. Or, finally, increased utilization of prenatal care might not improve birth outcomes, simply because prenatal care did not somehow mitigate the causes of adverse birth outcomes for this target population in particular or for pregnant women in general.

2.2 PROBLEMS OF EVALUATION DESIGN

Given the complexity of the link between Medicaid eligibility and birth outcomes, our evaluation design had to consider the possibilities outlined above. At the same time, there were certain intrinsic problems that made the Medicaid expansions particularly difficult to evaluate:

1. **The expansions are equivalent to uncontrolled experiments. As a result, the practical research designs are limited.**

This point is obvious, but it substantially frames the analytical possibilities. Within each state, the intervention is accessible to all eligible pregnant women. As a result, there is no natural control group against which to estimate the effects of the expansions. The only practical research design available is some form of a pre/post design, that in effect uses the pre-intervention period for each unit of analysis (e.g., a state or county) as a proxy for its own control.

2. **Adverse birth outcomes are relatively rare, even among low-income women. At the same time, the newly eligible population represents a small proportion of all mothers, and policy concerns force attention to some relatively small sub-groups within the newly eligible population. Special efforts must be made to ensure that analyses have adequate statistical power.**

Adverse birth outcomes are relatively rare events. Even among low-income women, perinatal and infant mortality rates rarely exceed 2% of live births. At the same time, the majority of pregnant women are unaffected by the Medicaid program, and the *newly-eligible* population under the Medicaid expansions represents a small proportion of all births. As a result, even if the expansions had large positive effects (e.g., reducing infant mortality among the target population of new enrollees by, say, 10%), those effects would be missed unless our evaluation designs had sufficient statistical power to detect relatively small changes.

At the same time, adverse birth outcomes are associated with certain demographic characteristics of the mothers — e.g., age, marital status, education, and, especially, race/ethnicity — in ways that are especially important for policy purposes. Unless sample sizes are extremely large, the cell sizes for critical groups — e.g., black teenaged mothers — will be relatively small. As a result, there will be inadequate statistical power for detecting small changes for important groups. That is no minor failing, since one key reason for the expansions was to improve results for such groups.

The ultimate implication of all these concerns is that special efforts must be made to ensure that analyses have adequate statistical power to let us infer that the expansions have indeed wrought positive changes for the key target groups. There are a number of strategies that can be employed to this end. First, and most directly, larger sample sizes and oversampling on the rare characteristic provide an obvious, direct solution to the problem of detecting small changes and coping with small cell sizes. Second, there are some analytic methods that provide more statistical power for any given sample of mothers, albeit at a cost in other respects. For example, other things being equal, analyzing high-risk mothers or high-risk geographic areas separately — rather than together with more general populations — reduces the variance of estimators and increases the power of the analysis, albeit at some cost in generalizeability to populations other than the particular populations sampled. Case-control methods can be used to structure samples that overrepresent otherwise rare adverse outcomes. That over-representation gives increased statistical power for detecting small effects on rare outcomes. But it does so at the price of introducing possible bias into the estimators.

As discussed more fully in Section 3 below, our evaluation includes analyses embodying each of these approaches.

3. Any intervention to improve birth outcomes through prenatal care is subject to *selection bias*: women who obtain prenatal care differ from women who do not obtain care, in terms of risk factors that simultaneously determine both the likelihood of obtaining care and the outcome of the pregnancy itself.

There is nearly universal agreement among obstetric experts that early initiation of prenatal care and a regular pattern of visits during pregnancy help to ensure a safe delivery and a healthy infant. And most empirical studies show that the effect of prenatal care on birthweight, prematurity, and infant survival is pronounced (e.g. Gortmaker, 1979; Grossman and Joyce, 1990; Rosenzweig and Schultz, 1982; and Showstack et. al. 1984).

But it is in fact quite difficult to quantify the effectiveness of prenatal care in preventing undesirable birth outcomes. As noted by the Institute of Medicine (1985), the overriding problem in non-randomized studies assessing the impact of prenatal care is that women who obtain at least some prenatal care differ from women who do not obtain care — and they differ in terms of risk factors that simultaneously determine both the likelihood of obtaining care and the outcome of the pregnancy. Similarly, Rosenzweig and Schultz (1982) and Corman et al. (1987), among others, have pointed out that maternal characteristics associated with the use of early or frequent prenatal care may themselves be related to birth outcomes, thereby biasing the measured effectiveness of prenatal care. The bias may work in either direction:

- If women who believe themselves to be at particularly high risk for poor outcomes seek out care earlier, on average, than women who do not, then the measured effectiveness of prenatal care in preventing poor outcomes will understate its true effectiveness.
- Conversely, if women who are most concerned with improving the prospects for the infant — say, by attention to proper diet, exercise, and the avoidance of risky behavior — are also most likely to seek early prenatal care, then the effectiveness of prenatal care will be overstated.

This selection bias, in whatever direction, is difficult entirely to avoid. The principal reason: the classical research response — a controlled experimental design — is not available, since no one seriously proposes denying routine prenatal care to women in randomly assigned control groups. Without random assignment to treatment and control groups, the only protection against selection bias is the use of research designs and statistical methods to control for influences that jointly affect birth outcomes and the decision to use prenatal care. Unfortunately, as noted by Schmitz (1995), in the researcher's struggle to develop adequate controls, mothers have a major advantage: mothers know more about their preferences and the riskiness of their pregnancies than datasets ever will tell the researcher. As a result, there are intrinsic limits on the researcher's ability to control for the role that mothers' preferences and knowledge play in mothers' choices to seek care. With less than full statistical control, no study of the effects of prenatal care on *individual* birth outcomes can entirely avoid the threat of selection bias.

The literature suggests that women who begin prenatal care in the first trimester of pregnancy deliver infants who are 100 - 200 grams heavier, on average, than women who receive little or no prenatal care (e.g., Harris, 1982; Rosenzweig and Schultz, 1982; and Showstack et. al., 1984). Because of the methodological problems affecting all studies of prenatal care, these results could not be considered definitive. But they were the best estimates available prior to Abt Associates' MCCA evaluation.

4. **Pre/post analyses must be based on longitudinal datasets, but none of the available longitudinal datasets has a direct, reliable measure of income for women *before and after* the expansions. As a result, the target population for the expansions can only be approximately identified.**

To analyze the effects of the expansions, we need some method to compare relevant measures (e.g., prenatal care utilization or birth outcomes) before and after the expansions, for the population of poor/near-poor women who were ineligible before the expansions but became eligible after the expansions. Unfortunately, no available longitudinal dataset so cleanly isolates this population. The key problem is that income data for pre/post populations are not readily available.[11] Thus, Abt Associates' MCCA Evaluation uses indirect measures — e.g., education, marital status, and median household income in Zipcode areas — to infer which women are in the target population. These measures obviously identify the target population only approximately, and thus introduce some error into any statistical estimates. Given other problems — notably, the small effects we are trying to detect, sometimes for small sub-populations — this added error reduces the likelihood that we will detect significant effects, even when the true effects are relatively large.

5. **Utilization measures commonly available (e.g., on the timing and frequency of care) are blunt instruments for measuring "prenatal care." As a result, we cannot be sure we are measuring all of the variations in care that may be important in explaining birth outcomes.**

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[11] For example, at the state level, income data are available on Medicaid enrollees over time. However, the Medicaid enrollee files do not contain any income data on non-enrollees. As a result, direct income measures for a key group -- non-enrollees before the expansion -- do not exist. Meanwhile, those national datasets with direct income measures -- e.g., the self-reported income measure in the 1988 NMIHS dataset used by Schmitz (1995) and Irvin (1995b) in Abt Associates' MCCA Evaluation -- are cross-sectional and do not permit us to do analyses with pre/post designs.

One of the uncertainties surrounding the effects of prenatal care concerns exactly what characteristics of prenatal care are associated with improved birth outcomes. Available longitudinal datasets generally do not include fine measures of the content of prenatal care. At best, measures of timing and frequency are available. While the timing and frequency are important dimensions of care, these measures fail to track much of what occurs in the course of prenatal visits — e.g., the timing, frequency, and content of counseling that is offered, tests that are administered, assistance that is given to obtain social services, and other elements of prenatal care that may be varying across prenatal care episodes. To that extent, researchers are less able to explore the variations in the volume and content of care that may be important to explain birth outcomes.

6. In view of the challenges described above, no single "best" database exists to evaluate the Medicaid expansions.

The challenges described above pose an important cumulative obstacle to the evaluation of the Medicaid expansions. Specifically, no single database exists that can resolve all of the challenges outlined above: i.e., no database that can capture the pre- and post-expansion experience, identify the eligible population, measure the interventions with precision, and control for influences other than the expansions that may have produced observed changes in outcomes. For example, large longitudinal databases for national samples (e.g., vital statistics files) capture pre- and post-expansion experience; record summary characteristics of mothers such as age, education, and marital status; identify a payer for (at least some of) the care; and provide certain summary measures of the timing and frequency of care. But they do not contain other important information, such as the content of care and mothers' incomes. Databases that provide more of this missing data (e.g., the National Maternal and Infant Health Survey, described in greater detail in Section 3 below) do not capture pre- and post-expansion experience.

Since no single study or dataset could resolve all of the challenges described above, it was important in the Abt Associates MCCA Evaluation to attempt a portfolio of approaches, using different and complementary datasets and evaluation designs. Those approaches are described in the next section.

3.0 ABT ASSOCIATES' MCCA EVALUATION: AN OVERVIEW OF THE STUDIES, DATA, AND METHODS

There are six major research studies in Abt Associates' MCCA Evaluation. These studies can be broadly divided into two groups: studies using national datasets and small-area studies.

3.1 STUDIES USING NATIONAL DATASETS

Abt Associates' MCCA evaluation included three studies based on national datasets:

1. Schmitz, R., Payer Source, Prenatal Care, and Birth Outcomes: An Analysis of the National Maternal and Infant Health Survey (1995)

One response to the methodological difficulties outlined in Section 2 above is to utilize the most richly detailed data sources available. While selection bias and other confounding influences cannot be eliminated entirely, a data source with detailed demographic and behavioral descriptors permits more extensive measured sources of variation, thereby increasing our confidence that there are fewer unmeasured sources of variation to bias our results. The assumption is that these extensive descriptors permit us statistically to control for at least some large fraction of what are — in less richly detailed data sources — unmeasured sources of variation affecting the outcomes of interest.

Schmitz (1995) uses the most detailed national dataset available on pregnant women and birth outcomes: the 1988 National Maternal and Infant Health Survey (NMIHS).[12] To the NMIHS data, Schmitz added county-level data on provider availability, unemployment rates, and county infant mortality rates. For present purposes, the primary disadvantages of the NMIHS dataset are that it is cross-sectional rather than longitudinal and, in any event, covers a year that is early in the stream of state Medicaid expansions. As a result, it offers little insight into expansion effects *per se*. But the compensating advantages are compelling: the richness of the outcomes. In contrast, Cole (1995) uses a longitudinal dataset of county- and state-level aggregates of United States vital statistics data to identify the effects of Medicaid changes within the target population of low-income women. County of residence, marital status, and education are alternatively used to identify populations that are disproportionately Medicaid-eligible. Cole estimates the impact of Medicaid changes on prenatal care utilization (measured by delay of care beyond the first trimester) and on two measures of infant health at the birth: low birthweight (birthweight less than 2,500 grams) and preterm birth (gestation less than 36 weeks).

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[12] NMIHS was conducted by the Bureau of the Census for the National Center for Health Statistics. Stratified samples of live births, infant deaths, and fetal deaths occurring in 1988 were drawn from birth certificate records in 48 states, the District of Columbia, and New York City. (Montana and South Dakota were not included.) Because most of the pregnancies in the sample occurred in 1987 and 1988, there are likely to be few women in the sample from states that expanded Medicaid coverage early -- i.e., there are likely to be a few "expansion" births in the sample.

Cole follows Currie and Gruber (1994) in exploiting the state variation in Medicaid eligibility changes in order to identify the effects of the expansions. Using aggregate vital statistics data, she examines changes in county or state rates of prenatal care utilization and birth outcomes. One danger of this method of analysis is that omitted characteristics at the county and state levels that affect the average birth outcome may be correlated with the changes in Medicaid policy. To alleviate that threat, Cole (following Currie and Gruber) estimates fixed effects specifications of the model she tests. The fixed effects models are more restrictive since only within-county (or within-state) differences in birth outcomes are used in obtaining estimates of the Medicaid effect.

Even with aggregate data and fixed-effects specifications, there are methodological issues to overcome. Most important, as noted earlier, there is a real concern that the analysis will fail to detect positive effects on such a rare event as an adverse birth outcome to a Medicaid-expansion mother. Cole's principal strategy for detecting these effects is to focus on the effects of the Medicaid expansions within (alternative, necessarily approximate definitions of) the target population of low-income women. She relies on proxies to identify the target population since income is not reported on birth certificates and hence is not part of the vital statistics data used in her study. The proxies that she uses are all correlated with income: county of residence, marital status, and education. Cole's approach is conservative in the sense that the imprecise measurement of income through the use of such crude proxies increases the variance of estimates and biases the estimated effects of Medicaid toward zero.

3. **Irvin, The Receipt of Prenatal Care Services Across Different Medical Risks and Levels of Utilization: Evidence from the 1988 National Maternal and Infant Health Survey, (1995b)**

As a complement to the Cole and Schmitz studies, Irvin uses the 1988 NMIHS data to explore the content of prenatal care — specifically, whether the receipt of various prenatal services varies systematically across women. Irvin's analysis reviews how the content of prenatal care varies by riskiness of the pregnancy, demographic characteristics of the mothers, and their levels of prenatal care utilization. The findings of this study are descriptive and were limited in certain ways by the NMIHS data.

However, if the results must be treated with some caution, they represent a picture of prenatal care drawn from the largest and richest database available for studying the content of prenatal care.

3.2 SMALL AREA ANALYSES — THE MISSOURI STUDIES

An additional way to deal with the complexities of evaluating the Medicaid expansions is to choose a smaller, more homogeneous area in which to study the effects of the initiative in finer detail, with a greater understanding of the local context and systems of health care provision. While the Medicaid program and the Medicaid expansions can be thought of in "national" terms, the program and its expansion also have critical state dimensions as well. Some of what needs to be understood can only come from the detailed understanding of the intricacies of single states.

As a result, the Abt Associates' MCCA Evaluation performed a set of detailed qualitative and quantitative studies of the implementation of the Medicaid expansions in Missouri. We chose Missouri in part because that state had implemented a MCCA-like expansion (to 100% FPL, without any streamlining of enrollment procedures) effective January 1988. We also focused on Missouri for practical reasons: the state had been actively collecting the kind of linked vital statistics and Medicaid claims data that would be helpful to us, and officials in the state were generous in their willingness to assist us. Meanwhile, there were no particular ways in which Missouri or its Medicaid program were so unusual as to argue against examining that state (see discussion in Coulam, 1995).

Our Missouri studies were based on a diverse array of data sources, including: 1) linked birth/death certificate data for Calendar Year (CY) 1987 through CY 1989 (i.e., before and after the January 1988 expansion in Missouri); 2) Medicaid eligibility and claims data linked to the birth/death certificate data for CY 1987 through CY 1989; 3) extended interviews with state officials; 4) administrative documents and reports. In the absence of income and household composition information on the available Missouri data bases, we predicted which Missouri women would be most likely to belong to low-income households, using a statistical model estimated on data from the National Maternal and Infant Health Survey and Missouri Medicaid data. These women represented the target population in analyses of the Missouri expansions. [13]

We performed three major studies of the Medicaid expansions in Missouri:

1. Coulam, The Expansion of Medicaid Eligibility for Pregnant Women in Missouri: A Case Study, (1995)

A case study permits us to understand processes, politics, and problems of implementation in a way that could not be readily understood through more aggregated studies. For example, it permits us to review how state/local context and circumstances affected the implementation of the expansions in one setting. This detailed information provides one example of how the expansions were implemented and provides important background for interpreting the results of the quantitative studies described below.

2. Irvin, C. D. Kidder, and K. Calore (hereinafter, Irvin et al.), The 1988 Expansion of Medicaid Eligibility for Pregnant Women in Missouri: Effects on Medicaid Enrollment, Prenatal Care Access, and Birth Outcomes, (1995)

Irvin et al. present the results of two major studies in this report. First, they present a detailed quantitative analysis of the first Missouri Medicaid expansion in January 1988. This study uses linked vital statistics and Medicaid claims to explore the effects of the first Missouri

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[13] Income data from surveys are subject to substantial reporting error, and modeling the relationship between income and other influences involves errors in estimation. Therefore, in order to increase the likelihood that our predictions would include women eligible under the new expansion rules as well as women eligible under the pre-expansion rules, we used the model to cast a wide net, predicting which women would live in households under 200 percent of the Federal Poverty Level (rather than the 100 percent ceiling that defined the first Missouri Medicaid expansion). This approach probably overstates the number of women eligible for Medicaid.

Medicaid expansion on enrollment, utilization, and birth outcomes. This study by and large presents unadjusted estimates of the incidence and frequency of prenatal care utilization and birth outcomes, by income level and Medicaid enrollment. Since the estimates are not adjusted, there is an unavoidable risk that the effects of the expansion will be confounded with other factors — notably, factors that jointly affect: 1) a woman's propensity to take-up Medicaid coverage and utilize prenatal care services, and 2) her risks of adverse birth outcomes. The authors report that multivariate analyses they explored did not change the results. However, they go on to emphasize that these multivariate results do not eliminate the risks of selection bias and other problems in the analysis.

Second, Irvin et al. report on a case-control study of the relationship between prenatal care and birth outcomes, using the pooled Missouri data for 1987 - 1989. This work seeks to exploit the Missouri data to establish the more general relationship between prenatal care and birth outcomes. The case-control methodology does not mitigate the risks of selection bias, but it does provide increased statistical power for detecting the effects of prenatal care, especially for relatively rare mortality outcomes.

3. Irvin, C., Missouri Infants: Utilization and Reimbursements of Medicaid Financed Health Services after the Mandated Expansion of 1988 (1995a)

The final Missouri study is only indirectly connected to the others, since it focuses on a different aspect of the Medicaid expansions: coverage of infants, rather than pregnant women. In Missouri, as elsewhere, coverage of infants and children increased gradually through the late 1980s. As with the coverage of pregnant women, these "child expansions" occurred under the impetus of federal legislative options and mandates. In January 1988, the Missouri Medicaid program went beyond the mandate of MCCA (to cover infants up to 1 year/100% FPL) and provided coverage for children at 100% FPL up to age 2.[14] Irvin used a pre/post design to study patterns of utilization and reimbursement for Missouri infants from 1987 - 1990. This analysis provides a summary of the effects of the Medicaid expansions for children enrolled in the program. This is the only study of infant health care in Abt Associates' MCCA evaluation.

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[14] Previously, child eligibility had been based on AFDC, which effectively ended child eligibility at household income levels over roughly one-third of FPL. Note that the Missouri legislation implementing this change also provided for increasing the age limit on eligibility by one year each October thereafter, up to age 5/100% FPL in October 1990.

3.3 ABT ASSOCIATES' MCCA EVALUATION: CONCLUSION

Since no controlled evaluation design was possible, there was no single or best design to evaluate the Medicaid expansions. To reach defensible judgments on the results of that initiative requires analyses from a variety of different vantage points, each selected to obtain a different set of relative strengths. That is what the Abt evaluation has sought to do, in each case examining the expansions in the context of earlier and parallel work on the three key relationships at issue: the effects of the expansions on enrollment, the effects of enrollment on timely and adequate utilization, and the effects of timely and adequate utilization on birth outcomes.[15] Meanwhile, Abt examined the implementation of the expansions in one state to provide a richer qualitative context for understanding the expansions and to complement small-area studies already in process or published by other researchers.[16]

The results of all of these Abt studies are not unambiguous or entirely consistent. But that is not surprising, given the variety of methods and datasets that were exploited in this work. Taken together, however, these studies present a powerful and provocative story of the effects of the expansions. In the following four sections, we bring this material together to provide focused answers to key questions of the expansions.

4.0 THE EFFECTS OF THE EXPANSIONS ON ENROLLMENT

The first — and, it would seem, least problematic — assumption in the Medicaid expansions was that a formal expansion of eligibility would increase the availability of health coverage, as the newly eligible enrolled in the program. This expectation was reinforced by the fact that, at varying rates across the states, eligibility procedures were being streamlined under the impetus of federal legislation.

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[15] As noted earlier (Section 3.1), Cole (1995) explores the relationship between the expansions and: 1) prenatal care timing, and 2) birth outcomes. She does not examine the intervening relationship between prenatal care and birth outcomes.

[16] For example, see the work by Piper and her colleagues (1990 and 1994) on expansions in Tennessee; and work by Haas and her colleagues (1993a and 1993b) on an expansion-like program in Massachusetts. Meanwhile, with HCFA funding, the RAND Corporation is completing a study of the Medicaid expansions in Florida.

4.1 ENROLLMENT OF PREGNANT WOMEN IN MISSOURI (IRVIN ET AL., 1995)

During the second half of the 1980s, voluntary and mandated expansions of Medicaid coverage substantially increased Medicaid enrollment among low-income pregnant women in many states. In an analysis of trends in Medicaid deliveries and delivery payments in 12 states over the period from 1988 through 1990, Schwartz (1993) reported that Medicaid-covered deliveries increased by 44%, Medicaid's share of total deliveries grew by 29%, and Medicaid payments for deliveries increased by over 400%. Four states participating in the Medicaid Statistical Information System (Georgia, Iowa, Utah, Washington) plus Missouri implemented Medicaid expansions during this period. Enrollment growth in these states ranged from 23.1% in Washington to 75.2% in Missouri.

Our best information on the effects of the expansions on enrollment are from Irvin et al. (1995), who analyze vital statistics data to estimate the effects of the first Medicaid expansion on Medicaid enrollments in Missouri. The first Medicaid expansion in Missouri was effective January 1988. It increased eligibility levels to 100% FPL for pregnant women. There were no important changes in eligibility procedures or refinements to target the program more specifically on particular sub-groups. According to Irvin et al., the first expansion had the following effects by 1989 among low-income women (see Exhibit 4.1):

- There was a large overall increase in the Medicaid share of births — For low-income pregnant women only, the Medicaid share of single live births increased from 34% in 1987 to 53% in 1989 (data not shown). For all single live births, the Medicaid share increased from just over 13% in 1987 and to nearly 23% in 1989.

- The increases were greater for pregnant women from demographic groups that were underrepresented in the Medicaid program prior to the expansion — By 1989, there had been larger relative increases in the Medicaid share of births for white, teenaged, high-school educated, and married women — as compared to black, adult, less-than-high-school educated, and unmarried women. With respect to racial and other higher-risk categories, the increase in Medicaid share of births was greater for the following mothers: whites (versus blacks), teenagers (versus adults), married (versus unmarried), better educated (versus those with 12 years

EXHIBIT 4.1 Abt Associates Evaluation of the Medicare Catastrophic Coverage Act (MCCA):

MISSOURI MEDICAID BIRTHS
AS A PERCENT OF ALL SINGLE LIVE BIRTHS:
by Demographic Characteristic and Period

	MEDICAID SHARE OF BIRTHS (Percent)		
CHARACTERISTICS	Baseline Period[a]	Expansion Period[b]	Percentage Change
ALL LIVE BIRTHS	13.2	22.5	70.5
RACE			
Black	39.7	49.0	23.4
White	8.4	17.3	106.0
Other	5.2	16.4	215.4
Unknown	26.7	25.6	(4.1)
AGE			
Teenaged	27.7	50.3	81.6
Adult	11.0	17.9	62.7
Unknown	0.0	9.5	-
MARITAL STATUS			
Married	4.1	10.6	158.5
Unmarried	42.2	54.5	29.1
Unknown	72.8	0.0	(100.0)
EDUCATION			
Less than 12 years	31.8	50.9	60.1
12 or more years	8.5	15.1	77.6
Unknown	19.4	34.2	76.3
PARITY			
First	11.4	22.2	94.7
Second or higher	14.2	22.7	59.9
Unknown	0.0	10.3	-
INCOME-DEFINED ZIP QUARTILE			
Lowest	27.0	40.9	51.5
Second	14.1	26.7	89.4
Third	8.9	16.8	88.8
Highest	2.5	5.5	120.0
RESIDENCE			
Urban	12.4	19.9	60.5
Rural	15.2	28.5	86.3
Unknown	42.9	56.0	30.5

NOTES: a. Pregnancies ending in single live births in 1987. Total number of observations: 73,263.
b. Pregnancies beginning in 1988 through 1989 and ending in a single live birth. Total number of observations: 94,390.

SOURCE: Reproduced from Irvin, Kidder, and Calore (1995), Exhibit 3.3, based on Abt Associates File of Missouri Linked Vital Statistics/Medicaid data: 1987-1989, for HCFA Contract No. 500-89-0063.

> or less education), primiparous (versus multiparous), and those in the 2nd through 4th income quartiles (versus those in the lowest quartile).
>
> Overall, gaps were narrowed between some of these subgroups, as generally less risky categories (whites, married women, women with higher levels of education) increased their share of births more substantially (data on teenagers may point in the other direction). Similar patterns were generally true within subgroups — e.g., among low-income mothers, the same relative changes occurred (except with respect to education, for which increases in share were greater for less educated low income mothers).

The Missouri Medicaid program for pregnant women was thus more likely to be white, teenaged, educated, and married after the expansion than before.[17] The composition of enrollees should have been driven by the nature of the program intervention, underlying trends in the demographic composition of the population, and trends in fertility rates among demographic subgroups of pregnant women. In fact, the results noted above occurred despite some evidence for increasingly unfavorable risk frequencies (e.g., increasing fertility among black and teenaged women) in the larger population from which enrollees were drawn. But to the extent that being white or married are attributes associated with reduced risks, both of inadequate use of prenatal care and of adverse birth outcomes, the expansion should have been associated with lower average risks among Medicaid women. The contribution of increased teenage enrollment is ambiguous (particularly given that abortion rates for teenagers were declining at this time).

4.2 THE EFFECTS OF THE EXPANSION ON THE ENROLLMENT OF INFANTS (IRVIN, 1995A)

At the same time that Missouri expanded Medicaid eligibility for pregnant women with incomes at or below 100 percent of the FPL, it expanded eligibility for children at or below 100 percent of the FPL and 2 years of age or younger. Irvin (1995a) analyzed the results, based on a file of merged Medicaid claims and birth certificate files for children born during calendar years 1987 and 1989 in Missouri. Her enrollment results for infants are similar to her results for pregnant women. Specifically, she found that the expansion increased enrollment considerably. For the 1988 and 1989 birth cohorts, enrollment of infants through the expansion program increased by 58%, from almost 3,200 infants to nearly 5,000 infants. Overall enrollment of infants in the Missouri Medicaid program — i.e., Medicaid enrollment including children eligible under AFDC requirements — increased by 42% between these two periods.

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[17] This paragraph is drawn from Irvin et al. (1995).

Because the intent of the expansion was to extend Medicaid coverage to children who historically did not meet eligibility criteria governing income or family structure, the newly eligible infants were expected to differ from those traditionally enrolled in the Medicaid program. Irvin found that they did. Compared to traditional enrollees, expansion infants were more likely to have mothers who were white (84%, compared to 52% of AFDC infants in the 1989 birth cohort), had higher educational attainment levels (58% had 12 or more years of schooling, compared to 51% in the AFDC group), and more likely to be married (60%, compared to 23% in the AFDC group). Overall, as the expansion was implemented, infants participating in Missouri's Medicaid program had mothers who were more likely to be white, married, and have at least a high school level of education.

4.3 ENROLLMENT ESTIMATES FROM A NATIONAL SAMPLE (COLE, 1995)

Abt Associates' MCCA evaluation provided one final set of estimates on the effect of the expansions on enrollment (Cole, 1995). Cole uses vital statistics data to estimate the Medicaid-eligible fraction of the population of women. Her estimates are limited by the available data and thus should be treated with some caution. She finds that the Medicaid-eligible fraction of the population of childbearing age (18-44) increases from 6.7% in 1983 to 7.0% in 1987 (the year OBRA 1986 took effect). Thereafter, the Medicaid-eligible population increases quickly, to 17.5% of all births by 1990. The question then becomes what proportion of the eligible population actually enrolled. To answer that question, Cole performs a sub-analysis on 10 states[18] for which claims data on deliveries were available (data on Medicaid-reimbursed prenatal care were not available). Cole finds that a 10 percentage point increase in the Medicaid-eligible population is associated with an increase of approximately 5% in Medicaid-financed deliveries in this sample of states from 1987-1990.

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[18] The 10 states are Arkansas, California, Georgia, Iowa, Michigan, Montana, Tennessee, Utah, Washington, and Wisconsin.

5.0 THE EFFECT OF MEDICAID ENROLLMENT ON THE UTILIZATION OF PRENATAL CARE

Getting pregnant women to enroll in Medicaid was only an intermediate objective of the Medicaid expansion. For that enrollment to have any potential of affecting birth outcomes, Medicaid coverage had to translate into timely utilization of prenatal care. A key issue, therefore, is whether or not newly eligible women increased their utilization of prenatal care.

5.1 THE EFFECTS OF THE EXPANSION ON THE UTILIZATION OF PRENATAL CARE BY LOW-INCOME WOMEN: ANALYSIS OF MISSOURI DATA (IRVIN ET AL., 1995)

In Abt Associates' MCCA evaluation, Irvin et al. (1995) provide an individual-level analysis of utilization in one state, based on the Missouri file of linked vital statistics and Medicaid claims. One clear objective of the Medicaid eligibility expansions was to improve the timing and adequacy of prenatal care utilization for low-income pregnant women who qualified for enrollment. Available data from Missouri suggest that Medicaid-enrolled women gained relative to poor but non-enrolled women during the first Missouri expansion. However the population of low-income pregnant women as a group did not uniformly achieve that objective. Specifically, the first expansion was associated with the following effects:

- Teenaged and adult mothers — Among all Medicaid-enrolled teenaged mothers, percentages with some care and timely care *increased*, while the percentage with "inadequate" care declined. Adult Medicaid enrollees experienced similar improvements. In contrast, utilization of non-enrollees generally deteriorated, absolutely and relative to their enrolled counterparts. After the expansion, enrollees' rates of some and timely care were higher than non-enrollees' for both adult and teenaged women. However the percentage of adult enrollees with inadequate care, which was higher than the non-enrollees percentage before expansion, remained higher after expansion. In contrast, enrolled teenaged mothers improved relative to their non-enrolled counter parts. (Exhibit 5.1 below). Among all low-income teenaged mothers, the percentages with some care and timely care were essentially unchanged, while the percentage with "inadequate" care increased 1.3 percentage points. In contrast, rates of some and timely care declined among low-income adult women, and inadequate care increased 2.4 percentage points (Exhibit 5.2 below).

EXHIBIT 5.1 Abt Associates Evaluation of the Medicare Catastrophic Coverage Act (MCCA) Evaluation

UTILIZATION OF PRENATAL CARE SERVICES AMONG LOW-INCOME[A] TEENAGED AND ADULT MISSOURI WOMEN:
by Age, Period, and Medicaid Enrollment

	Baseline Period[b]		Expansion Period[c]			
	Enrolled	Not Enrolled	Enrolled			Not Enrolled
			Total	AFDC[d]	Expansion[e]	
Teenaged						
Number of Observations	2,267	4,310	5,288	3,677	1,611	3,816
			Percent			
Some Care	96.4	95.8	96.8	96.2	98.0	94.6
Timely Care[f]	86.8	88.0	88.2	86.8	91.4	86.2
APNCU Index						
Adequate Plus	14.0	15.2	16.5	16.0	17.5	15.3
Adequate	28.2	32.0	28.8	27.0	32.9	31.4
Intermediate	19.2	19.9	17.4	16.8	18.8	16.6
Inadequate	36.3	29.3	33.8	36.5	27.4	32.0
Missing	2.3	3.5	3.6	3.7	3.4	4.7
Adult						
Number of Observations	5,199	9,899	9,193	6,879	2,314	9,188
			Percent			
Some Care	96.3	96.8	95.0	94.0	98.0	94.9
Timely Care[f]	89.1	91.2	87.4	85.9	91.8	89.4
APNCU Index						
Adequate Plus	16.2	16.7	18.1	18.3	17.4	18.2
Adequate	30.2	38.6	28.6	26.3	35.4	37.0
Intermediate	20.2	20.0	17.1	16.6	18.6	17.4
Inadequate	31.1	22.0	32.4	35.0	24.6	22.7
Missing	2.3	2.7	3.8	3.8	4.1	4.7

Notes:
a. Women estimated to be living in households with income less than 200% of FPL.
b. Pregnancies ending in single live births in 1987.
c. Pregnancies beginning in 1988 through 1989 and ending in a single live birth.
d. Women qualifying under AFDC requirements.
e. Women qualifying under expansion requirements. Income is less than 100% of FPL.
f. Initiated care during the first two trimesters.

Source: Abt Associates File of Missouri Linked Vital Statistics/ Medicaid data: 1987- 1989, for HCFA Contract No. 500-89-0063.

EXHIBIT 5.2 Abt Associates Evaluation of the Medicare Catastrophic Coverage Act (MCCA):

UTILIZATION OF PRENATAL CARE SERVICES AMONG TEENAGED AND ADULT MISSOURI WOMEN: By Age, Period, and Income Group

	Baseline Period[a]			Expansion Period[b]		
	All Missouri Women	Non-Low-Income[c] Women	Low-Income[d] Women	All Missouri Women	Non-Low-Income[c] Women	Low-Income[d] Women
Teenaged						
Number of Observations[e]	9,872	3,171	6,577	13,427	4,125	9,104
			Percent			
Some Care	96.2	97.3	96.0	95.8	96.5	95.8
Timely Care[f]	88.5	91.2	87.6	87.7	89.0	87.4
APNCU Index						
Adequate Plus	14.7	14.5	14.8	15.9	15.8	16.0
Adequate	32.6	36.9	30.7	32.0	37.2	29.9
Intermediate	19.2	18.8	19.7	16.6	15.7	17.1
Inadequate	30.3	27.3	31.7	31.3	27.6	33.0
Missing	3.2	2.6	3.1	4.3	3.7	4.1
Adult						
Number of Observations[e]	63,390	47,769	15,098	80,847	61,522	18,381
			Percent			
Some Care	98.4	99.2	96.6	97.8	99.0	94.9
Timely Care[f]	95.7	97.6	90.5	95.1	97.4	88.4
APNCU Index						
Adequate Plus	17.5	17.9	16.6	19.0	19.3	18.1
Adequate	51.0	56.0	35.7	50.2	55.6	32.8
Intermediate	18.3	17.8	20.1	16.2	15.9	17.3
Inadequate	11.2	6.7	25.1	11.9	7.1	27.5
Missing	2.0	1.5	2.5	2.7	2.0	4.3

Notes:
[a] Pregnancies ending in single live births in.
[b] Pregnancies beginning in 1988 through 1989 and ending in a single live birth.
[c] Women estimated to be living in households with income more than 199% of FPL.
[d] Women estimated to be living in households with income less than 200% of FPL.
[e] Not all women could be classified into the income groups. These women are in the total, but do not appear in the disaggregated estimates.
[f] Initiated care during the first two trimesters.

Source: Abt Associates File of Missouri Linked Vital Statistics/ Medicaid data: 1987- 1989, for HCFA Contract No. 500-89-0063.

- Black and white mothers — Before expansion, low-income white mothers not enrolled in Medicaid were more likely than enrolled mothers to receive some care and timely care. The reverse was true for black mothers, though the pre-expansion differential between enrolled and non-enrolled was small. After expansion, enrolled white mothers were equally likely to receive some care, though the non-enrolled retained a relative advantage in timely care. Among black mothers, enrollment produced marked relative improvement, of 2.8 percentage points in the frequency of having some care and 3 percentage points in the frequency of timely care. It should be noted that this change represents a relative improvement for the enrolled in the context of deteriorating rates for both enrolled and non-enrolled low-income black mothers. The rate of inadequate care tells a similar story. Rates increased for black mothers, but the relative disadvantage among enrolled black mothers declined somewhat. Rates of inadequate care decreased for white mothers, with almost no change in the enrolled/non-enrolled differential. (Exhibit 5.3). Although the population of low-income black mothers were less likely to receive some or timely care after expansion, these rates of utilization remained nearly constant over the period 1987-1989 for white mothers. The frequency of inadequate prenatal care increased in both groups (Exhibit 5.4).

- All low-income mothers — The Medicaid expansion was not associated with an increase in prenatal care utilization among low-income mothers generally. For example, as shown in Exhibit 5.5 below, the percentage of all low-income mothers who used any prenatal care dropped 1.2 percentage points between the baseline period and the expansion period; and the proportion of all low-income mothers who initiated care in a timely way (first two trimesters) declined 1.6 percentage points.

- Medicaid-enrolled, black, and unmarried low-income mothers — For each of these groups, there was a decline overall in the proportion with some care and the proportion with timely care (Exhibit 5.5). The proportion of mothers with "inadequate" care increased among most such groups.

As shown in Exhibit 5.5, low-income expansion mothers have higher rates of utilization than AFDC mothers, before or after the expansion. That result is not surprising, given the higher incomes of the expansion mothers. Perhaps of greater note, it appears that the expansion enrollees tended to have greater propensities to use prenatal care services. For example, see the data on low-income teenaged enrollees in Exhibit 5.1. The proportion of mothers with some care and timely care has gone down for non-enrollees, while the expansion enrollees clearly have

EXHIBIT 5.3: Abt Associates Evaluation of the Medicare Catastrophic Coverage Act (MCCA) Evaluation:

UTILIZATION OF PRENATAL CARE SERVICES AMONG LOW-INCOME[A] BLACK AND WHITE MISSOURI WOMEN:
by Race, Period, and Medicaid Enrollment

	Baseline Period[b]		Expansion Period[c]			
	Enrolled	Not Enrolled	Enrolled			Not Enrolled
			Total	AFDC[d]	Expansion[e]	
Black						
Number of Observations	4,013	4,298	6,451	5,673	778	4,625
				Percent		
Some Care	96.6	95.0	93.8	93.5	96.3	91.0
Timely Care[f]	90.0	89.2	86.5	85.7	91.7	83.5
APNCU Index						
Adequate Plus	17.5	18.2	19.8	19.8	19.4	18.5
Adequate	29.1	31.4	24.4	23.7	29.4	26.9
Intermediate	18.5	17.9	16.3	15.9	19.4	14.9
Inadequate	33.2	28.7	35.3	36.6	25.7	32.2
Missing	1.7	3.7	4.3	4.1	6.0	7.5
White						
Number of Observations	3,426	9,798	7,923	4,814	3,109	8,260
				Percent		
Some Care	96.0	97.1	97.2	96.3	98.5	96.9
Timely Care[f]	86.7	90.8	88.7	86.7	91.7	91.3
APNCU Index						
Adequate Plus	13.3	15.5	15.6	14.8	16.8	16.7
Adequate	30.1	38.9	32.2	29.9	35.7	40.3
Intermediate	21.5	20.9	18.0	17.6	18.5	18.4
Inadequate	32.1	22.2	31.0	34.3	25.9	21.5
Missing	3.0	2.6	3.3	3.4	3.2	3.1

Notes:
a. Women estimated to be living in households with income less than 200% of FPL.
b. Pregnancies ending in single live births in 1987.
c. Pregnancies beginning in 1988 through 1989 and ending in a single live birth.
d. Women qualifying under AFDC requirements.
e. Women qualifying under expansion requirements. Income is less than 100% of FPL.
f. Initiated care during the first two trimesters.

Source: Abt Associates File of Missouri Linked Vital Statistics/ Medicaid data: 1987- 1989, for HCFA Contract No. 500-89-0063.

EXHIBIT 5.4 Abt Associates Evaluation of the Medicare Catastrophic Coverage Act (MCCA):

UTILIZATION OF PRENATAL CARE SERVICES AMONG BLACK AND WHITE MISSOURI WOMEN: by Race, Period, and Income Group

	Baseline Period[a]			Expansion Period[b]		
	All Missouri Women	Non-Low-Income[c] Women	Low-Income[d] Women	All Missouri Women	Non-Low-Income[c] Women	Low-Income[d] Women
Black						
Number of Observations[e]	11,413	2,996	8,311	15,588	4,215	11,076
				Percent		
Some Care	96.2	98.3	95.8	93.1	96.1	92.7
Timely Care[f]	90.8	95.3	89.6	86.5	91.6	85.2
APNCU Index						
Adequate Plus	19.4	24.3	17.9	20.3	23.5	19.2
Adequate	33.6	43.0	30.3	29.0	39.3	25.4
Intermediate	17.5	16.0	18.2	15.3	14.5	15.7
Inadequate	26.4	14.1	30.8	29.5	18.0	34.0
Missing	3.0	2.7	2.7	5.9	4.6	5.6
White						
Number of Observations[e]	61,401	47,301	13,224	77,470	60,459	16,183
				Percent		
Some Care	98.5	99.1	96.8	98.5	99.0	97.0
Timely Care[f]	95.5	97.3	89.7	95.6	97.3	90.0
APNCU Index						
Adequate Plus	16.7	17.3	14.9	18.2	18.8	16.2
Adequate	51.4	55.7	36.6	51.4	55.6	36.3
Intermediate	18.6	18.0	21.0	16.5	16.0	18.2
Inadequate	11.3	7.5	24.8	11.6	7.7	26.2
Missing	1.9	1.5	2.7	2.3	1.9	3.2

Notes:
a. Pregnancies ending in single live births in.
b. Pregnancies beginning in 1988 through 1989 and ending in a single live birth.
c. Women estimated to be living in households with income more than 199% of FPL.
d. Women estimated to be living in households with income less than 200% of FPL.
e. Not all women could be classified into the income groups. These women are in the total, but do not appear in the disaggregated estimates.
f. Initiated care during the first two trimesters.

Source: Abt Associates File of Missouri Linked Vital Statistics/ Medicaid data: 1987- 1989, for HCFA Contract No. 500-89-0063.

EXHIBIT 5.5 Abt Associates Evaluation of the Medicare Catastrophic Coverage Act (MCCA):

UTILIZATION OF PRENATAL CARE SERVICES AMONG MISSOURI WOMEN:
All Mothers, Low-income Mothers, and Sub-groups of Low-income[a] Mothers, by Period

					SUB-GROUPS OF MISSOURI LOW-INCOME[a] MOTHERS						
	ALL MISSOURI MOTHERS		MISSOURI LOW-INCOME[a] MOTHERS		BLACK MOTHERS		UNMARRIED MOTHERS		MEDICAID-ENROLLED MOTHERS		
										Expansion Period[c]	
CHARACTERISTICS	Baseline Period[b]	Expansion Period[c]	Baseline Period[b]	Expansion Period[c]	Baseline Period[b]	Expansion Period[c]	Baseline Period[b]	Expansion Period[c]	Baseline Period[b] (AFDC)[d]	AFDC[d] Enrollees	Expansion[e] Enrollees
NUMBER OF OBSERVATIONS	73,263	94,390	21,675	27,485	8,311	11,076	12,050	17,295	7,466	10,556	3,925
TIMELINESS -- PERCENT WITH:											
Some Care	98.1%	97.5%	96.4%	95.2%	95.8%	92.7%	95.3%	93.8%	96.3%	94.8%	98.0%
Timely Care[f]	94.7%	94.0	89.6%	88.0%	89.6%	85.2%	87.5%	85.6%	88.4%	86.2%	91.6%
APNCU INDEX -- PERCENT WITH:											
Adequate Plus	17.2%	18.5%	16.0%	17.4%	17.9%	19.2%	15.7%	17.2%	15.6%	17.5%	17.4%
Adequate	48.5	47.6	34.2	31.9	30.3	25.4	30.0	27.5	29.6	26.6	34.4
Intermediate	18.3	16.3	20.0	17.2	18.2	15.7	18.6	16.5	19.9	16.6	18.7
Inadequate	13.8	14.7	27.1	29.4	30.8	34.0	32.7	33.9	32.7	35.6	25.8
Missing	2.1	3.0	2.7	4.2	2.7	5.6	3.0	4.9	2.3	3.7	3.8
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

NOTES:
- a. Women estimated to be living in households with income < 200% of FPL.
- b. Pregnancies ending in single live births in 1987.
- c. Pregnancies beginning in 1988 through 1989 and ending in a single live birth.
- d. Women qualifying under AFDC requirements.
- e. Women qualifying under expansion requirements. Expansion requirements in Missouri allowed women up to 100% FPL to enroll.
- f. Women who initiated care during the first two trimesters.

SOURCES: Reproduced from Irvin, Kidder, and Calore (1995). See relevant portions of Exhibits 4.3 (All Low-Income Mothers), 4.4 (Medicaid), 4.6 (Black), 4.12 (Unmarried), which were based on Abt Associates File of Missouri Linked Vital Statistics/ Medicaid data: 1987-1989, for HCFA Contract No. 500-89-0063.

higher rates of care and timely care than non-enrollees.[19] Ideally, as Irvin et al. note, if prenatal care as such improves birth outcomes, then we would particularly like the expansion to reach women who have lesser propensities to use (or lesser access to) prenatal care. Instead, the data suggest that there was favorable selection from the eligible population into the Medicaid program — particularly among black, teenaged, and unmarried women — in that utilization rates for Medicaid-enrollees tended to rise in comparison to (or to decline more slowly than) utilization of non-enrollees.

Available data did not permit Irvin et al. to determine definitively whether these results are due to access barriers, the behavior of the target population, or other factors. Data on provider caseloads, based on Medicaid claims, suggest the influence of access barriers. Medicaid providers, particularly those that offered both prenatal care and delivery services, increased in numbers over the expansion period (See section 8.1 below). These are not conclusive findings, since we have incomplete information on trends in total provider caseloads (Medicaid and non-Medicaid) that could suggest whether or not providers are increasing service to Medicaid enrollees, at the expense of non-enrolled but eligible women. However Irvin's analysis does imply that the access of low-income women to prenatal care involves more than the availability of a third-party payer — in this case, Medicaid. We will have more to say on this issue in Section 8 below, when we examine how the expansions fit into the larger system of care for indigent women in Missouri.

5.2 PRENATAL CARE UTILIZATION: ANALYSIS OF STATE-LEVEL VITAL STATISTICS (COLE, 1995)

As noted earlier, Cole uses national vital statistics data to analyze associations between Medicaid eligibility changes and the county- and state-level rates of certain key outcomes for the target population of low-income women. One of those outcomes is prenatal care utilization, measured as the rate of delay in the initiation of care until after the first trimester. It will be most convenient to discuss Cole's findings on utilization later in this paper (Section 7.0), when we review her findings on birth outcomes. However, it may be helpful to note her findings on utilization here, as they are somewhat different in their implications than the findings of Irvin et al. discussed above. Specifically, with reference to her state-level analyses, she finds that there is a statistically significant association between the Medicaid expansions and decreased prenatal care delay, within the population of teenaged mothers and unmarried mothers.

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[19] Irvin et al. (1995) go on to show that this was also true for black and unmarried enrollees.

5.3 THE CONTENT OF PRENATAL CARE UTILIZATION: ANALYSIS OF THE NMIHS DATA (IRVIN, 1995B)

In a separate study, Irvin (1995b) uses the 1988 NMIHS data to explore the content of prenatal care — specifically, whether the receipt of various prenatal services varies systematically across women. Irvin's analysis reviews how the content of prenatal care varies by the riskiness of the pregnancy, the demographic characteristics of mothers, and levels of prenatal care utilization. The principal results are as follows (data not shown):

- Riskiness of the pregnancy — The utilization of prenatal care services was uneven with respect to the riskiness of the pregnancy. In general, women with risky pregnancies were no more likely to receive most services than women with low-risk, normal pregnancies.

- Demographic characteristics of the mothers — While utilization is very imperfectly related to the riskiness of the pregnancy, it is more closely associated with the demographic characteristics of the mothers. Regardless of the medical risk complicating the pregnancy, women who started care early and had the recommended number of visits were characteristically white, had at least 12 years of education, were married, used a private office as their usual site of prenatal care, and had their care covered by private insurance.

- Level of utilization — The receipt of particular prenatal care services did not vary systematically across different overall levels of utilization. That is, the proportion of women receiving any given service did not increase as the level of utilization increased from inadequate to adequate. Some results were as expected: e.g., compared to women with more adequate utilization, women with inadequate prenatal care were less likely to have had an α-fetoprotein test. This result is consistent with the timing of the test's administration (the test is typically administered between the 16th and 18th week of gestation). But other results were at least superficially paradoxical: e.g., compared to women with more adequate care, women who had an inadequate level of care were generally more likely to have received all early risk assessment tests and procedures. This finding appears to have been driven by the fact that women with inadequate levels of care were more likely to receive an ultrasound during the first two prenatal care visits — a result presumably reflecting providers' uncertainties about gestation and dating the pregnancies.

- Health insurance Mothers enrolled in Medicaid, regardless of demographic or medical risk characteristics, were more likely to receive inadequate care than any other payer-related group. Medicaid rates of inadequate care were three to four times larger than rates for mothers with private insurance. However, among mothers at low risk, Medicaid rates of adequate plus care were higher than rates for the privately insured.

The findings of this study are purely descriptive. However, if the results must be treated with some caution, they represent a picture of prenatal care drawn from a particularly large and detailed database. The overall message from that data is critical: there is no simple, purposeful link between the riskiness of the pregnancy, the overall level of utilization, and the content of services. Thus, if we imagine, say, that the determinants of the content of care are purposefully linked to the mother's needs — e.g., that women with higher pregnancy risks will receive more of the needed tests — we are making an assumption that these data, at least, cannot support. Similarly, if we imagine that the character of the pregnancy and the level of utilization determine the content of care — rather than the mother's race, age, marital status, site of care, and payer — we again would be imagining a system in which needs and care were more effectively linked than these data suggest.

In short, while these findings must be treated carefully, they suggest that the content of prenatal care that a mother actually receives is determined by a more complex model than we might otherwise assume. Effective care for mothers likely involves more than just being sure that women seek early and timely care.

6.0 THE EFFECTS OF PRENATAL CARE ON BIRTH OUTCOMES

Obviously, if prenatal care does not somehow improve birth outcomes, all of the worry about enrollment and utilization would be for naught: the problematic utilization results in Missouri would not matter, for example, because the care, if received, would not have caused any material difference in birth outcomes. Two studies in our evaluation addressed this issue.

6.1 CROSS-SECTIONAL ANALYSIS: ANALYSIS OF THE NMIHS DATA (SCHMITZ, 1995)

The 1988 NMIHS dataset provides particularly detailed measures of variation, thereby increasing our confidence that there are fewer unmeasured sources of variation to bias our results. Using that data source, Schmitz (1995) reaches important findings on the relationship between the timing and adequacy of prenatal care and key measures of birth outcomes (specifically, birthweight, length of gestation, and fetal and perinatal survival). To explore these issues, Schmitz adopts two approaches to estimating the critical relationships, as noted in Section 3.1: direct estimation and instrumental variables estimation. The two approaches yield fairly consistent results. As shown in Exhibit 6.1, Schmitz finds a clear association between timely prenatal care and positive birth outcomes. Specifically, based on certain restrictive assumptions,[20] he finds that *the delay of prenatal care by one month is associated with a reduction in birthweight of 20 - 33 grams for white women and 22 - 56 grams for black women.* These findings are at the high end of estimates by others.

Still, these cross-sectional results leave open the question of whether *the expansions* had a positive effect. For that purpose, we need longitudinal data.

6.2 LONGITUDINAL DATA FOR ONE STATE: ANALYSIS OF THE RELATIONSHIP BETWEEN PRENATAL CARE AND BIRTH OUTCOMES IN MISSOURI, 1987 - 1989 (IRVIN ET AL., 1995)

A final approach to analyzing the relationship between prenatal care, the Medicaid expansions, and birth outcomes is Irvin et al. (1995). Irvin et al. summarize the results of two major studies in this report. First, they present a detailed quantitative analysis of the effects of the utilization changes that accompanied the first Medicaid expansion in Missouri in January 1988. Recall that, despite a substantial increase in enrollment that accompanied the first expansion, low-income women on average did not increase their utilization of prenatal care services. The findings of Irvin et al. for birth outcomes mirror the utilization results: birth

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[20] The most important assumption is that certain variables — such as payer source, the number of OB/GYN providers, state Medicaid generosity, and the perception (or lack thereof) of financial, scheduling, or travel difficulties in receiving prenatal care — affect birthweight *only* through their effect on prenatal care received. If that assumption is not true, then the estimates of the effects of initiation of care on birthweight shown in the exhibit will be associated with other risk factors or behaviors, not prenatal care.

EXHIBIT 6.1 Abt Associates Evaluation of the Medicare Catastrophic Coverage Act (MCCA):

ESTIMATED EFFECT ON BIRTH WEIGHT OF A ONE-MONTH DELAY IN INITIATION OF PRENATAL CARE

	ESTIMATE	BLACK		WHITE	
		Effect on Birth Weight	N	Effect on Birth Weight	N
1.	Birth weight adjusted for mother's height and weight	21.5 grams	6,859	19.9 grams	7,461
2.	Birth weight adjusted for mother's height and weight; prenatal care initiation drawn from mother's NMIHS report	55.5 grams	2,902	24.9 grams	4,300
3.	Birth weight unadjusted for mother's height and weight; prenatal care initiation drawn from birth certificate	20.0 grams	7,725	33.0 grams	8,370

SOURCE: Reproduced from Schmitz (1995), which is based on the National Maternal and Infant Health Survey (NMIHS) analyzed for HCFA Contract No. 500-89-0063.

outcomes remained stable for low-income women generally and for Medicaid enrollees in particular. Both before and after expansion, neonatal and infant mortality rates for infants born to low-income, non-enrolled women were higher than for Medicaid enrolled women. Medicaid's relative advantage in this regard was more pronounced for black mothers (for whom enrollment meant an expected neonatal mortality rate approximately one-third the rate for the non-enrolled, compared to one-half for white mothers).

These findings support those of other researchers who conclude that, while the provision of Medicaid coverage is necessary, it is not sufficient without administrative and payment changes that reduce the indirect costs of using medical services among low-income women (e.g., Braveman, et al., 1993; Haas et al., 1993a and 1993b; and Piper et al., 1994). However, the findings of Irvin et al. must be interpreted cautiously, since the estimates they present are generally unadjusted estimates of incidence and frequency of prenatal care utilization and birth outcomes, as noted earlier. Possible selection bias and other problems could confound their results.

Second, Irvin et al. report a case-control study of the relationship between prenatal care and birth outcomes, using pooled Missouri data for 1987 - 1989. The case-control methodology does not mitigate the risks of selection bias. The absence of control for selection bias may cause an over- or under-estimation of the effects of prenatal care, depending on the nature of the bias, so these results must be interpreted cautiously. At the same time, it can be argued that the criteria used to select controls for such an analysis "overmatch" cases and controls, so that the important independent effects of race, age, and other matching variables cannot be explicitly modeled. Any bias due to overmatching, however, is toward the null hypothesis; i.e., the hypothesis that prenatal care has no effect. If the methods used to select controls for this analysis have indeed resulted in overmatching, then the estimates of effectiveness reported by Irvin et al. are presumably smaller than they would have been had controls been selected randomly. And the methodology does provide increased statistical power for directly estimating the effects of prenatal care on birth outcomes, especially on relatively rare mortality outcomes.

The results are interesting: the case-control study suggests that *adequate prenatal care, or the use of any prenatal care at all, is associated with reduced risks of low birthweight and infant mortality* (data not shown). For example, Irvin et al. report data showing that the receipt of adequate or intermediate prenatal care is clearly associated with lower rates of very low birthweight. Women with adequate care face a relative risk almost one-quarter lower than women with inadequate care, after adjusting for other measured risks. Absence of any prenatal care increases the relative risk of a very low birthweight infant by a factor of more than seven. Prior fetal death, being underweight, and smoking during pregnancy all increase the risk of having a low birthweight infant. Meanwhile, predicted relative risks of mortality were generally consistent with the results of the birthweight estimates presented above. The estimated odds ratios reported in this study are of sufficient size as to increase our confidence that prenatal care did reduce mortality and risks of low birthweight in Missouri.

7.0 RELATIONSHIP OF THE EXPANSIONS TO BIRTH OUTCOMES: ANALYSIS OF NATIONAL VITAL STATISTICS FILES, 1983 - 1990 (COLE, 1995)

As noted earlier, Cole (1995) uses county- and state-level aggregates of United States vital statistics data for the years 1983 - 1990, to identify the effects of the Medicaid expansions within the target population of low-income women. The results at the county level (data not shown) suggest small, but mixed, effects. Specifically, the Medicaid expansions were associated with small significant increases in the utilization of prenatal care (i.e., a lower rate of prenatal care delay beyond the first trimester), but mixed effects on birth outcomes (significant effects were found on the rate of preterm births but Medicaid expansion is not associated with reductions in the incidence of low birthweight). As Cole notes, these results do not provide convincing evidence of the impact of Medicaid expansion in high poverty counties. It may be that choosing "high-poverty" counties is not an efficient way to isolate the target population. Alternatively, the results may suffer from the shortcomings of the two-stage estimation procedure. Note that, among other things, the two-stage procedure tends to bias the estimated effects of the expansions to zero, since the first stage "nets out" the effect of covariates that are correlated with Medicaid eligibility (e.g. marital status, age, and education).

Cole also provides state-level analyses that show stronger evidence that the expansion of Medicaid was indeed associated with more timely prenatal care utilization and improved birth outcomes. The results are summarized on Exhibit 7.1. Overall, the state-level results suggest

EXHIBIT 7.1 Abt Associates Evaluation of the Medicare Catastrophic Coverage Act (MCCA):

NATIONAL VITAL STATISTICS STUDY -- STATE-LEVEL ESTIMATED EFFECTS OF EXPANSIONS ON PRENATAL CARE UTILIZATION AND BIRTH OUTCOMES

MEASURE	ABSOLUTE EFFECT (BIRTHS/1000 L.B.)	RELATIVE EFFECT (%)
UNMARRIED WOMEN		
Prenatal Delay		
Black	-7.4/1000	-1.8%
White	-18.1/1000	-4.7%
Low Birthweight		
Black	NS	NS
White	-2.3/1000	-3.1%
Preterm Birth		
Black	NS	NS
White	-3.2/1000	-4.1%
TEENAGED WOMEN		
Prenatal Delay		
Black	-13.2/1000	-2.8%
White	-18.4/1000	-4.6%
Low Birthweight		
Black	-3.1/1000	-2.5%
White	-1.6/1000	-2.3%
Preterm Birth		
Black	-7.6/1000	-5.1%
White	-2.9/1000	-3.8%

NOTE: NS = not signficant at the 5 percent level.

SOURCE: Cole (1995), Table 9.

that *an expansion of Medicaid that brings an additional 10% of the population into the eligible category reduces the rates of prenatal delay and poor birth outcomes by 2% to 5%.*

In interpreting the significance of these results, two points are worth noting. First, while these effects are small, they are robust to alternative specifications. Second, given that the target population (all Medicaid-eligible mothers) is only approximately segregated for these analyses by the prediction method we used to identify women in households with incomes below 200% of FPL — thereby increasing the variance of the estimates — the fact that *any* association is detected between an expansion of Medicaid eligibility and birth outcomes is an important finding.

8.0 THE EFFECTS OF THE EXPANSIONS ON STATE HEALTH CARE SYSTEMS: CASE STUDY OF THE MISSOURI EXPERIENCE

The Medicaid expansions were implemented as part of a complex, imperfectly documented[21] system of care for indigent pregnant women. We have some indication that how the expansions are implemented may influence their effects: for example, as discussed in Section 5.1 above, there is some indication in our utilization data for Missouri that the access of low-income women to prenatal care involves more than the availability of "coverage." These data point to possible influences of the supply side of indigent care on access to and utilization of care among indigent, pregnant women.

It is thus important for us to consider how the state implemented the expansions — and the effects that the expansions had on state health care systems and on other areas of state health care policy. In this section, we consider those larger, admittedly somewhat diffuse issues of implementation and their effects on systems of prenatal care in the state. The result of this examination is a surprisingly strong set of implications for initiatives to expand prenatal care services. In particular, these data point to two problems with the implementation of the Medicaid expansions in Missouri: unchanged levels of physician participation amidst increasing demand, and the financing of the expansions from limited state budgets, by taking funds from other important programs providing prenatal services to indigent women. We discuss each of these issues in turn.

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[21] The system is imperfectly documented in a variety of ways -- most important for the Medicaid expansions, in terms of understanding all of the different sources of indigent care for which the Medicaid expansions might substitute.

8.1 PHYSICIAN PARTICIPATION IN THE MEDICAID PROGRAM: EXPERIENCE IN THE EXPANSIONS (IRVIN ET AL., 1995)

Irvin et al. (1995) review physician participation in Missouri from 1987 - 1990. In that period, the Medicaid share of all live births in Missouri increased substantially, as discussed in Section 4 above. Among high-risk populations, the increases were substantially greater — as was the potential demand on physicians whose practices served such women. Ideally, the level and distribution of prenatal care providers would keep pace with the level and distribution of demand, to minimize concerns about potential congestion, appointment delays, waiting times, and other possible access barriers. Available data on this issue are relatively crude — the number of Medicaid claims for prenatal care versus the number of Medicaid providers — but even such crude data might provide a tentative reassurance that the supply side of prenatal care services in Missouri was not strained by the increased demand.

Irvin et al. present estimates of the changing numbers of Missouri Medicaid providers and caseloads, from 1987 - 1989 (see Exhibit 8.1). These estimates were constructed from Medicaid claims for prenatal care (i.e., for prenatal care only and for prenatal care and delivery services), aggregated by enrollee and provider type.[22] The results show that prenatal care providers increased by 12% (for prenatal care and delivery services providers) and 46% (for providers of only prenatal care), while the number of women served by these providers increased by approximately 90%. The inevitable result was that, on average, providers who served Medicaid pregnant women saw their caseloads increased substantially (between 29% and 73%).

Thus, provider participation in the Medicaid expansions does not appear to have kept pace with Medicaid enrollments. The implications of this result are not unambiguous. In particular, data presented by Irvin et al. measure changes in utilization by counting changes in what Medicaid paid for. As a result:

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[22] Note that the count of providers is only approximate (due to the unreliability of provider identification numbers), as is the count of "pregnant women" (since some women used both categories -- prenatal care only and prenatal care plus deliveries -- and thus would be double-counted in these utilization figures.

EXHIBIT 8.1 Abt Associates Evaluation of the Medicare Catastrophic Coverage Act (MCCA):

TRENDS IN PROVIDERS[a] OF MEDICAID PRENATAL CARE IN MISSOURI --
Providers of Prenatal Care Only and Prenatal Care Plus Delivery Services, 1987-1989

KEY CHARACTERISTICS, BY TYPE OF CARE	Year		Percent Change
	1987	1989	1987-1989
PRENATAL CARE ONLY			
Number of Providers	573	837	46%
Number of Women Served	6,066	11,472	89%
Avg. Number of Women Served	10.6	13.7	29%
Total Reimbursements	$660,404	$1,419,748	115%
PRENATAL CARE AND DELIVERY			
Number of Providers	537	602	12%
Number of Women Served	8,161	15,516	90%
Avg. Number of Women Served	19.9	34.5	73%
Total Reimbursements	$3,908,625	$9,379,873	140%

NOTES: a. Count of participating providers based on Medicaid claims, excluding hospital inpatient, optometrists, DME, LAB, X-ray ambulance and CRNA claims. Providers are classified as providing either prenatal care only or prenatal and delivery services. Recipients receiving care from both a prenatal care only and prenatal and delivery provider are included in both counts of recipients.

SOURCE: Reproduced from Irvin, Kidder, and Calore (1995), Exhibit 4.15, based on Abt Associates file of Missouri Linked Vital Statistics/Medicaid data, 1987-1989, for HCFA Contract #500-89-0063.

prenatal care. As state fiscal year 1988 began (i.e., a few months prior to the first Medicaid eligibility expansion), 4 large cities and 103 (of 114) counties were served by the Prenatal Clinic Program.

Two features of the clinics deserve special note. First, the clinics were designed to be particularly accessible for indigent populations. For example, these clinics appear to have had simple, inclusive eligibility criteria and procedures; easy summary billing by the clinics with few regulatory impediments; few limits on services, who performed them, and where they were performed; relatively simple administrative oversight; and less stigma for the patients who used prenatal services at health department clinics.

Second, these clinics provided an important share of prenatal care services for indigent women in the state. According to our best estimates, the city/county health departments were a prenatal care system at least comparable in magnitude to Medicaid — and likely somewhat larger. Thus, city/county clinics appear to have been a substantial alternative means of providing prenatal care to indigent pregnant women. Not least, these clinics appeared to represent an alternative source of care that had certain desirable access features for indigent women.

When the first expansion was being planned, the expected costs were $6.8 million per year for expansion pregnant women and $12.8 million per year for both expansion pregnant women and children. The marginal increases in funds needed for the expansion were supplied by reducing funds for other programs. Among the most important reductions was a cut in funds for Title V prenatal care clinics. Officials saw a wider role for Medicaid in the public financing of prenatal care services in the state. Specifically, the city/county clinics were to expand their billings to Medicaid on a fee-for-service basis instead of relying on Title V. However, the state did little to train, equip, or otherwise adapt the clinics to the more central role for Medicaid, apart from standard notifications and advisories to the clinics.

When the state cut funding for non-Medicaid maternal and child health programs run by the Department of Health, there was a large drop in prospective state funding for the clinic prenatal services and a drop as well in the actual services delivered. A major crisis ensued within the city/county clinics. By the fall of 1988, prenatal clinics serving 67 of the state's 114 counties had closed or threatened to close. In the wake of that crisis, state officials worked very hard, and with apparent success, to stabilize the new system.[23] But the Missouri expansion stands as a caution, emphasizing the difficulties of managing substantial shifts in public funding for prenatal care, without careful preparation and training.

There is at least some irony in the state's efforts to enhance Medicaid coverage, at the same time the state was contracting the prenatal clinics run by the city and county health departments. In particular, this experience argues against the undocumented assumption that expanding the number of pregnant women covered by Medicaid necessarily improved the system of prenatal care, particularly when the expansion of Medicaid is accompanied by the contraction of other key sources of care for indigent women. Other analysts (e.g., Braveman et al., 1993; Dubay et al., 1993; Haas et al., 1993a and 1993b; and Piper et al., 1990a) and journalists (e.g., Kong, 1992) have raised similar cautions, concerning Medicaid and other public sources of coverage. The data we have presented on Missouri reinforce that message and argue against the assumption that "coverage" — standing alone — is an undifferentiated good that *necessarily* improved the system of prenatal care in Missouri.

9.0 FINDINGS OF OTHER RESEARCHERS

Having reviewed the Abt Associates MCCA Evaluation, we should compare our findings to the findings of other researchers. Few researchers have directly assessed the association of Medicaid expansions with enrollment, prenatal care, and birth outcome trends. The principal exceptions are Long and Marquis (1995), Piper and her colleagues (1990 and 1994), Haas et al. (1993a and 1993b), and Currie and Gruber (1994).

Reporting findings from their study of Florida's 1989 Medicaid expansion, Long and Marquis (1995) conclude that the state's Medicaid program achieved significant gains in access to prenatal care and improved birth outcomes among newly-eligible women, in part by helping the public health system become part of the Medicaid provider system rather than by shrinking it (as in Missouri) to finance the expansion.[24] Total prenatal care visits provided by the county health departments increased by about 100% from 1988 to 1991, and women enrolled through the Medicaid expansion used more prenatal care than low-income uninsured women. Among expansion women in Florida, the incidence of low birthweight was significantly lower than among uninsured women.

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[23] Note that these efforts were not fully implemented by the end of 1989 and thus are not fully reflected in the Missouri data analyzed by Irvin et al. (1995).

Piper et al. (1990) examined a 1985 regulatory change in the Tennessee Medicaid program, whereby medically needy married women were made eligible for Medicaid during the time of their pregnancy. The Piper study found that Medicaid enrollment increased within the target group, but that there was no concomitant increase in the use of early (first trimester) prenatal care among the enrollees — indeed, more than two-thirds of the newly enrolled did so after the first trimester.[25] A later study by Piper et al. (1994) analyzed the effects of the 1987 Medicaid expansion for pregnant women in Tennessee (from 45% to 100% of FPL). The findings of this study are consistent with the findings of Irvin et al. (1995) in the Abt Associates MCCA evaluation. Specifically, Piper et al. find that the Tennessee expansion: 1) increased enrollment, especially for teenagers; 2) among teens, the odds of receiving no care or only late (third trimester) care declined; but 3) there were no significant improvements in first-trimester use of prenatal care, nor were there improvements in birth outcomes. The authors conclude that, while the expansion's greatest apparent effect was an improvement (i.e., a reduction) in *late* prenatal care, there was little improvement in *early* prenatal care. As with the results of Abt Associates' MCCA Evaluation, these results should be interpreted cautiously, because the analyses do not isolate the target population for the expansions (indeed, these analyses do so a lesser extent than the studies of Irvin et al. and Cole in the Abt Associates MCCA Evaluation).

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[24] In addition, Florida dropped the asset test, granted continuous eligibility through a woman's pregnancy, adopted presumptive eligibility, shortened the application form, and placed Medicaid eligibility workers in health care provider facilities. None of these supplementary changes were implemented during Missouri's 1988 expansion.

[25] Note that the late enrollment of beneficiaries in Tennessee was in part due to certain aspects of the eligibility process for the new program. For example, the Medicaid enrollment process could only begin after diagnosis of the pregnancy; and determination of eligibility hinged on family income after medical expenses, which meant that many women would become eligible only after incurring significant pregnancy-related medical expenses. In any event, given the limitations of available data, this study could not isolate newly eligible women from certain others, so that any increase in the use of early care among the newly eligible would have had to be large to have been detected.

Moreover, in common with other studies in this area, the work of Piper et al. does not control for confounding selection and other effects. But — much like the Missouri studies of Abt's MCCA Evaluation — the studies of Piper and her colleagues suggest that increasing Medicaid eligibility *alone* was not sufficient to increase the early use of prenatal care.

A second set of state-level analyses was performed by Haas and her colleagues (1993a and 1993b), who analyzed the effects of the "Healthy Start" program in Massachusetts. Healthy Start was a state-funded initiative that increased eligibility for uninsured pregnant women to 185% FPL in Massachusetts, effective December 1985. Using vital statistics and hospital discharge abstracts for 1984 - 1987, Haas et al. crudely identified the target population as uninsured mothers plus Healthy Start mothers.[26] The authors compared outcomes for the target group to those of two control groups: women with private insurance and those with Medicaid coverage. If Healthy Start had a positive effect, then there would be a reduction in interpayer differences in utilization and birth outcomes. However, in both studies, Haas et al. find no statistically significant changes in interpayer differences for any of the utilization or birth outcome measures examined.

In a study using a very different analytical approach, Currie and Gruber (1994) agreed that more was needed than a relaxation of income criteria for Medicaid eligibility expansions to be fully effective. As noted earlier (see Section 3.1 above), Currie and Gruber use aggregates of United States vital statistics data to identify the effects of Medicaid changes within the target population of low-income women. In the precursor to Cole's (1995) analysis for Abt Associates MCCA Evaluation, Currie and Gruber exploit state variation in Medicaid eligibility changes in order to identify the effects of the expansions. They find some evidence of improved birth outcomes at the national level: specifically, using simulated changes in the percent eligible in each state, Currie and Gruber found that an increase of 20 percentage points in eligibility was associated with a 7% decline in the infant mortality rate over the 1980s. The authors also distinguished targeted expansions — based on relaxations of categorical criteria for eligibility —

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[26] If Haas et al. had reliable income data, they could have isolated the target population more precisely, by identifying women at income levels without coverage in the pre-intervention period who become eligible in the post-intervention period. But lacking such data, Haas et al. resorted to a necessary expedient, using the overinclusive category of uninsured women before the expansion, and uninsured women plus Healthy Start women after the expansion, as a proxy for the target population.

from broad-based expansions based on income (similar to the Missouri and Tennessee expansions). They concluded that the targeted expansions were more effective than the broad-based expansions in reducing risks of adverse birth outcomes.

Together, the studies outlined above are reasonably consistent with the results of Abt Associates MCCA Evaluation. There is some evidence in these studies that the expansions had positive effects. But the effects are not so consistent and robust as to be revealed in all analyses and datasets; and as in Abt Associates' results, there is some indication in these other studies that Medicaid expansions addressed an important part — but only a part — of the access difficulties faced by indigent pregnant women.

10.0 CONCLUSION

The Medicaid expansions were a major change in the financing of perinatal care for poor and near-poor women. We have only studied those expansions through 1990. With the passage of time in states across the country, health care systems are almost certain to adapt to the expansions in ways that were not yet apparent in our evaluation studies (or, for that matter, in the studies of others discussed in the previous section). While those limitations are important, we can see in the results of Abt Associates' MCCA Evaluation a set of important findings concerning the effects of the expansions. Based on the weight of our evidence, the Medicaid expansions have made a positive contribution to the health of pregnant women and infants in the United States. Specifically:

- The expansions dramatically increased the enrollment of poor and near-poor pregnant women in Medicaid, although there are some indications (e.g., in our Missouri studies) that increases in Medicaid enrollment generally were greater for pregnant women from "lower risk" demographic groups.

- The effects of the expansions on utilization are mixed:

    - In national data, Cole (1995) finds small, but significant, increases in the timeliness of care.

    - Using Missouri data, Irvin et al. (1995) find that the timing and adequacy of utilization improved after the expansions for Medicaid-enrolled women; no measurable improvements were evident in the larger population of low-income women.

- In most analyses, there is a significant relationship between *prenatal care and birth outcomes*:
  - A cross-sectional analysis of NMIHS data by Schmitz (1995) finds that one month prenatal care delay is associated with a reduction in birthweight of 20-33 grams for white women and 22 - 56 grams for black women.
  - A case-control analysis of pooled Missouri data reported by Irvin et al. (1995) concludes that the use of prenatal care is associated with reduced risks of low birthweight and infant mortality.
  - But the pre/post analysis of Missouri data by Irvin et al. (1995) finds that the relationship of prenatal care and birth outcomes in Missouri remained stable for low-income women generally and for Medicaid enrollees in particular from 1987 - 1989.
- There is a small, but significant positive association between the *Medicaid expansions and prenatal delay/birth outcomes*:
  - Analysis of national vital statistics files by Cole (1995) shows a 10% increase in the women eligible reduces the rates of prenatal delay and poor birth outcomes by 2% to 5%.
- State-level implementation decisions can have a substantial influence on the effects of increasing coverage for indigent populations. The analysis by Coulam (1995) offers the strong suggestion that shifts in public funding for prenatal care require careful attention to how prenatal care is supplied, not just how it is financed. Analyses from other researchers, notably Long and Marquis (1995), depict the benefits of state policies that promote expanded prenatal care capacity for handling previously unfilled care needs.

Overall, these findings do not point to a simple set of results from the Medicaid expansions. But the story through 1990 is encouraging. Any evaluation of the Medicaid expansions faces serious methodological challenges (e.g., selection bias and the problem of detecting changes in the frequency of rare events) and key weaknesses in the available data (e.g., absence of good income measures to isolate the target population). Notwithstanding these problems, *Abt Associates' MCCA Evaluation does find statistically significant improvements in utilization and birth outcomes associated with the expansions.* As in the findings of other researchers, the findings of our evaluation do not show improvements everywhere and under all conditions — e.g., in Missouri, where there were problems in how the expansions were implemented. But our evaluation does suggest that the expansions yielded small and important improvements in the birth prospects for high-risk populations.

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